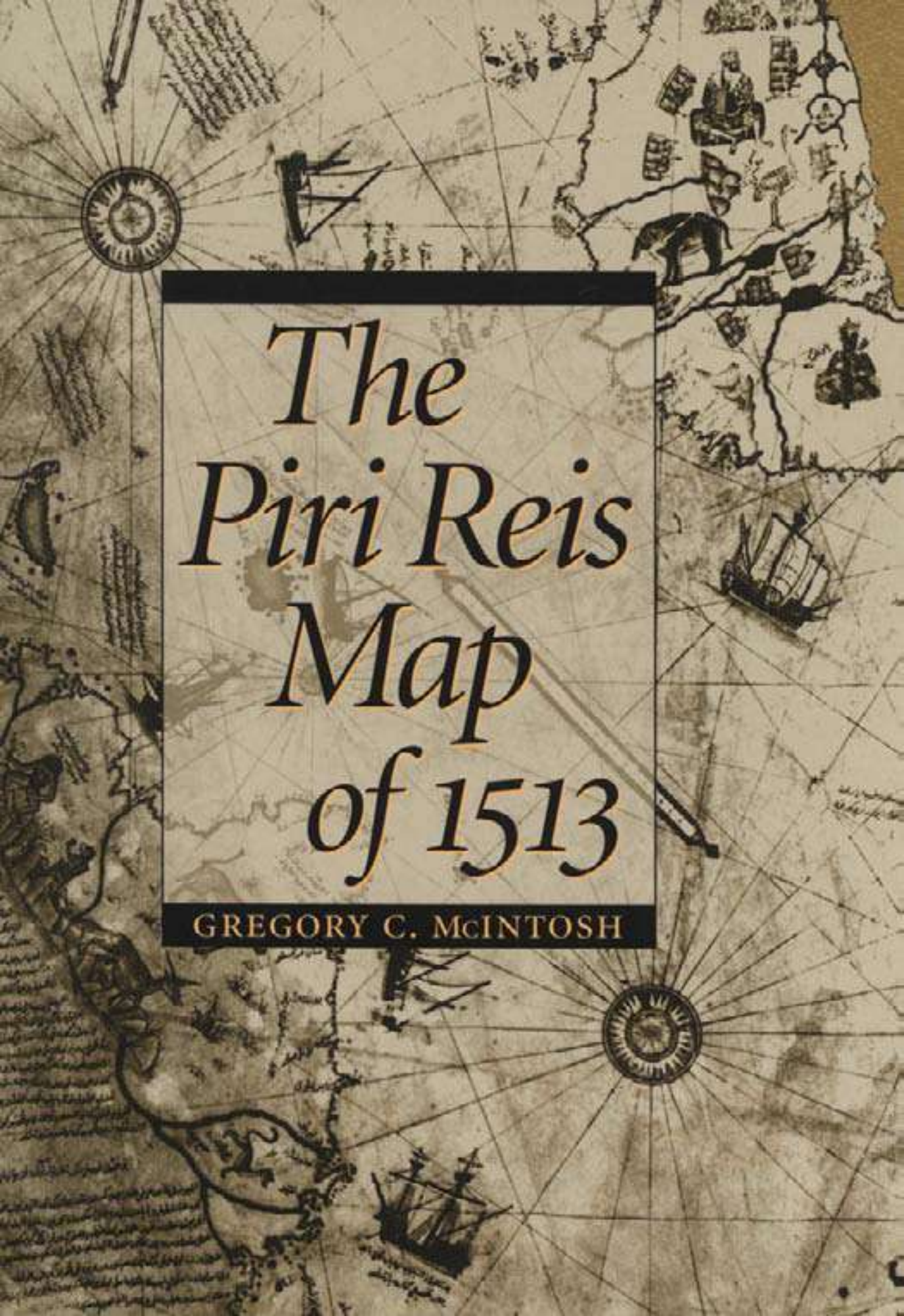
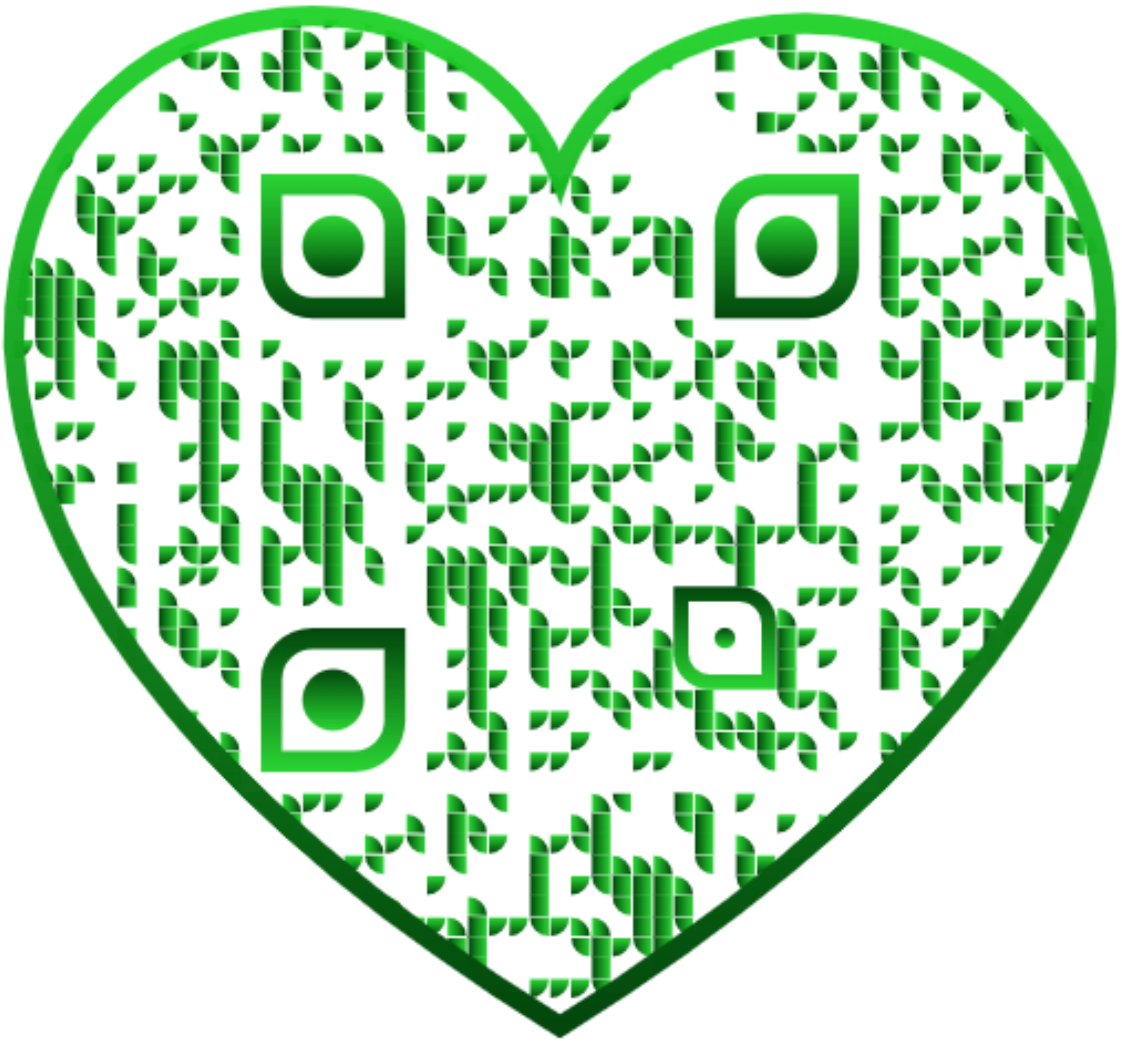
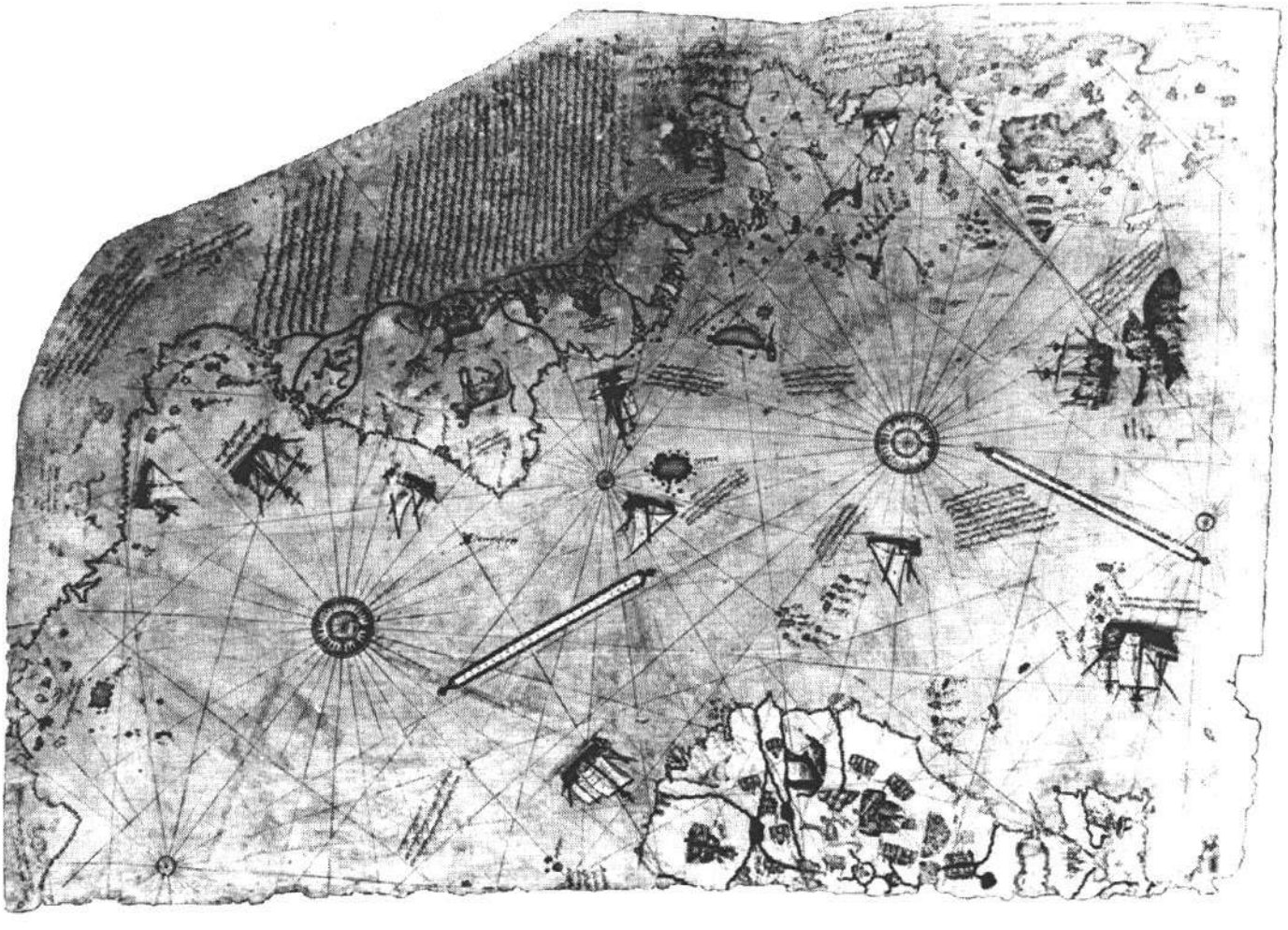


The Piri Reis Map of 1513

GREGORY C. McINTOSH



The Piri Reis Map of 1513



The Piri Reis Map of 1513

Gregory C. McIntosh

With a Foreword by Norman J. W. Thrower

THE UNIVERSITY OF GEORGIA PRESS † ATHENS & LONDON

© 2000 by the University of Georgia Press
Athens, Georgia 30602
All rights reserved

Designed by Walton Harris
Set in Minion by G&S Typesetters

Printed digitally in the United States of America

Library of Congress Cataloging in Publication Data

McIntosh, Gregory C.
The Piri Reis map of 1513 / Gregory C. McIntosh ; with a foreword by Norman J. W. Thrower.
p. cm.
Includes bibliographical references and index.
ISBN 0-8203-2157-5
1. Piri Reis, d. 1554? 2. World maps — Early works to 1800.
I. Title.
GA311 1513 .P3 M35 1999
912 — dc21 99-055689

British Library Cataloging in Publication Date available

Frontispiece: The Piri Reis map of 1513. (By permission of the Topkapi Palace Museum, Istanbul.)

ISBN for this digital edition: 978-0-8203-4359-4

CONTENTS

LIST OF FIGURES *vii*

LIST OF TABLES *ix*

FOREWORD *xi*

ACKNOWLEDGMENTS *xiii*

Introduction *1*

1. The Life of Piri Reis *5*
2. Description of the Map *8*
3. Europe and Africa *19*
4. The Atlantic Islands *26*
5. South America *35*
6. The Southern Continent *48*
7. The Christopher Columbus Inscription *69*
8. Puerto Rico and the Lesser Antilles *76*
9. Hispaniola and the Bahamas *87*
10. Cuba and Central America *103*
11. Conclusions *122*

APPENDIX A. Maps Referenced in the Text *141*

APPENDIX B. Cross-References of Inscription Numbers *155*

NOTES *157*

BIBLIOGRAPHY *197*

INDEX *217*

FIGURES

1. The Piri Reis map of 1513 *frontispiece*
2. Rhumb lines and compass roses of the Piri Reis map *11*
3. A suggested reconstruction of the whole Piri Reis map of 1513 *12*
4. The equator and tropic lines on the Piri Reis map *14*
5. Key map of inscriptions *16*
6. Key map of place-names in Europe, Africa, and the Atlantic islands *21*
7. Key map of place-names in South America *22*
8. Key map of place-names in the Caribbean *23*
9. The east coast of South America on early sixteenth-century maps *39*
10. The northeast coast of South America on early sixteenth-century maps *40*
11. The Southern Continent on the Piri Reis map and the Lopo Homem map *51*
12. The Swithinbank map of western Queen Maud Land *54*
13. The Piri Reis map and the Swithinbank map as superimposed by Arlington H. Mallery *55*
14. Antarctica, the Southern Continent of the Piri Reis map, and Terra Australis of the Oronce Fine map *57*
15. Azimuth equidistant projection maps *65*
16. The Lesser Antilles on the Piri Reis map and on a modern map *79*
17. *Kalewot* (Guadeloupe) on the Piri Reis map and on a modern map *83*
18. Hispaniola on the Piri Reis map (turned 90°) and on a modern map *89*
19. Cipango (Japan) on early maps *92*
20. Hispaniola on the Ferrara manuscript of c. 1502 *93*
21. Hispaniola and the Bahamas on the Piri Reis map *98*

22. Hispaniola on the Piri Reis map (turned 90°) and on the Cantino map of 1502 *99*

23. Cuba and Central America on the Piri Reis map *104*

24. The Asian mainland on early maps *107*

25. The Egerton MS. 2803, fol.7v & 8r, map of Central America *109*

26. The reconstructed boundary line between source maps in the Caribbean *112*

27. The mysterious northwest landmass on the Canerio map of c. 1505 *118*

28. Possible misplaced place-names in the Atlantic Ocean *124*

29. Possible misplaced place-names in South America *125*

30. Possible misplaced place-names in the Caribbean *126*

31. Modern identifications of features in Europe, Africa, and the Atlantic Ocean *128*

32. Modern identifications of features in South America on the Piri Reis map *129*

33. Modern identifications of features in the Caribbean on the Piri Reis map *130*

34. A suggested reconstruction of the Columbian source map of c. 1496 *139*

TABLES

1. Some Place-Names in Europe and Africa *24*
2. Island Names in the Atlantic Ocean *28*
3. Place-Names on South America and the Southern Continent *36*
4. Place-Names on Puerto Rico and the Lesser Antilles *78*
5. Place-Names on Hispaniola *88*
6. Place-Names on the Bahamas *97*
7. Place-Names on Cuba and Central America *105*
8. Cross-References of Inscription Numbers *156*

FOREWORD

One of the most controversial and enigmatic maps in the history of cartography is the Islamic chart which is the subject of this book. In fact, scholars have suggested that a detailed critique of certain claims made for this map is long overdue. Such an evaluation has now been undertaken in *The Piri Reis Map of 1513* by Gregory C. McIntosh, and much more besides. The author is both a professional engineer and a longtime member of the Society for the History of Discoveries. He thus brings to this study at least two essential qualities: a scientific impartiality and a broad understanding of the context in which this map must be viewed. These qualities are evident in the original and careful delineations of coastlines with which that of Piri Reis is compared and in the excellent bibliography of the subject. There are also useful tables and appendixes.

McIntosh begins his study by stating the problem with reference to the belief of some that the Piri Reis map represents lands and islands discovered on pre-Columbian voyages. The life and work of Piri Reis are reviewed, and his 1513 chart (of which only a part survives) is described and illustrated in admirable detail. Toponyms are analyzed and identified with modern equivalents exhaustively in reference to the principal regions of the chart: Europe and Africa, the Atlantic islands, South America, and the Southern Continent. It is the delineation of this last area which in the past has led to the wildest speculations.

However, most important to scholars of the Renaissance will be the inscription of Columbus and the examination of islands he visited on his first and second Atlantic voyages (1492–96): Puerto Rico and the Lesser Antilles; Hispaniola and the Bahamas; Cuba and other islands off Central America. The importance of the Portuguese cartographic influences affirmed by Piri Reis himself but minimized by later workers is perhaps the most important finding in this book. McIntosh comes to the striking conclusion that the Piri Reis map may be closer to the one [now lost] that Columbus made of his Caribbean discoveries than any other extant chart, even that of Columbus's brother Bartholomeo with Alessandro Zorzi (1503).

This and other ideas are only arrived at by dint of scholarly investigation and supported by textual and cartographic evidence. To appreciate this, one

must read McIntosh's book with care. This will have the additional advantage of showing various linkages between Christian and Muslim (especially Turkish) cultures and of appreciating how rapidly data on the voyages of Christopher Columbus reached the Islamic world and were incorporated into the non-European cartographic record.

—NORMAN J. W. THROWER

The Piri Reis Map of 1513

Introduction

The Piri Reis map of 1513 is one of the most beautiful, most interesting, and most mysterious maps to have survived from the Great Age of Discoveries. Yet it is one of the least understood maps of this momentous and remarkable period in the history of cartography and geographical explorations.

Many diverse claims have been made regarding this map: that it includes a copy of a map made in 1498 by Christopher Columbus, that it is the oldest map of the Americas, and that it is the most accurate map made in the sixteenth century. Some have argued that it shows evidence of the ability of the mapmaker to measure and perform spherical trigonometry calculations centuries ahead of its time, that it provides evidence of a worldwide seafaring civilization

existing tens of thousands of years ago, and that it proves Earth was visited by aliens from other planets.

These issues and others will be examined in this book. A detailed examination of the delineations, place-names, inscriptions, and layout of the map will be made. I hope that this analysis will answer some of the questions surrounding this fascinating cartographic artifact and indicate possible directions of more exhaustive future studies.

Although some of the cartographic depictions on the map may appear unusual to the modern eye, these depictions are wholly within the general body of cartographical and geographical knowledge of the late Middle Ages and early Renaissance. It will also be shown that the Piri Reis map of 1513 may be one of the most important maps of the time to have survived because it probably does contain a copy of a map made by Columbus, or under his supervision, not in 1498, as previously supposed, but two or three years earlier.

In relating the delineations and toponyms on the Piri Reis map to other maps of the time, a certain amount of uncertainty and hesitancy must enter into the discussion. Words such as *probably, seems likely, apparently,* and *plausibly* must be used because we have inexact and incomplete knowledge of the sources of information used by fifteenth-century and early sixteenth-century cartographers.[1] This should not prevent us, however, from inferring likely sources, based on the facts we do have.

Previous researchers of this map, such as Paul Kahle and Charles H. Hapgood, have matched almost every bay, promontory, coastal feature, and geographical element in the New World with an existing feature.[2] These researchers may not have understood that it was common for cartographers in the sixteenth century to draw coastlines and geographical features on their maps according to what they thought should be the case, not necessarily according to any knowledge of the actual geography. Hence, sixteenth-century maps commonly contain geographical features that do not really exist. It can be, in many cases, an error to seek to equate each and every feature on a fifteenth- or sixteenth-century map with an equivalent real geographical feature.

This mistaken premise of the researcher that each feature on an old map corresponds to a real feature is analogous to euhemerism, the theory that myths are based on traditional accounts of real people and events and that myth can be turned into history by deleting the supernatural elements. Perhaps the best-known example of this tendency in map interpretation is William H. Babcock, who believed that all of the legendary islands depicted in the North Atlantic Ocean on medieval and early Renaissance maps were distorted images of the lands and islands of the Western Hemisphere discovered by pre-Columbian voyagers. Although it is true that some legendary lands have some

historical basis (e.g., Vinland the Good, Taprobane, and Ophir), it is not necessarily true that all such lands do (e.g., Hyperborea, Valhallah, and Avalon). This inclination to excessively identify hypothetical coastal features with real geographical features will be noticed in some recent interpretations of the Piri Reis map.[3]

In discussing the details on the Piri Reis map, comparisons will be made to European portolan charts of the fourteenth and fifteenth centuries and maps of the early sixteenth century depicting portions of the newly discovered Americas.[4] In so doing, the close relationship of the Piri Reis map with more typical maps of the period will be established. It is, of course, not to be supposed that the Turkish mapmaker Piri Reis had direct access to all of these maps. Nor does the choice of comparative maps attempt to be a complete record of the maps in which a place-name, inscription, or feature occurs. Identifying those elements on his map which are common to other maps of the period assists in illuminating possible sources upon which Piri Reis drew. Moreover, this comparative study clarifies his methods of compilation.

Because of the fluid nature of coastlines, toponyms, delineations, and spellings on old maps (particularly those of the early sixteenth century), one must be circumspect in using these maps to prove a position or interpretation. Many things can be (and have been) "proved" with the sometimes mixed-up information on old maps, especially when only portions of the maps are used or they are used out of context. For example, the image of a king at the approximate location of Nova Scotia on the Vopell-Vavassore map of 1558 (and the ignoring of similar images in various scattered locations on the same map) has been used to support the claim that Scottish immigrants founded an agricultural colony in North America at the end of the fourteenth century, a hundred years before Columbus's first voyage.[5] Old maps can be like old myths—with careful selection and editing, anything can be "proved" about events in the distant past.

Other documents and textual materials will be cited where their use of a toponym or geographical description illuminates the appearance of that place-name or delineation on the Piri Reis map or upon the general context of geographical knowledge and mapmaking of this time. This is particularly true of early sixteenth-century documents that record the geography described and place-names used by Columbus during his voyages to the New World. Through this comparative study and the resulting indications of the sources of materials and methods of map construction used by Piri Reis, we will attempt to identify those elements which are copied from the Columbian source map Piri Reis has told us that he used.

Most of the maps mentioned in the text are briefly described with references

in appendix A. Because of the number of maps that are mentioned in the present work, only a few of them can be illustrated. The references in appendix A will direct those interested readers to reproductions of the maps and, in many cases, additional comments and analyses. By referring to the works cited in this appendix, the reader may view a reproduction of the particular map and obtain further information. No attempt has been made to be exhaustive in citing the references that reproduce the pertinent maps.[6]

1 *The Life of Piri Reis*

The cartographer who made the map (identified in inscription no. 4 on the map) was the famous Ottoman admiral known as Piri Reis.[1] He was born Muhiddin Piri, the son of Haci Mehmet, probably in Gallipoli, at the northwest extremity of the Dardanelles, about 1465–70. At the age of twelve, he joined the crew of his uncle, Gazi Kemal (c. 1450–1510), a corsair or privateer. In 1495, at the invitation of Sultan Bayzeid II (1447–1513; reigned 1481–1512), his uncle joined the Ottoman navy with the rank of Reis (admiral or captain), and became known as Kemal Reis.

Piri served under his uncle's tutelage for fourteen years. Six of those years (1487–93) were spent along the coasts of North Africa, Italy, Spain, and the islands of the western Mediterranean. He later wrote that during this time, "We

sailed on the Mediterranean and fought the enemies of our religion mercilessly."[2] Only a few decades earlier, Constantinople had fallen to the Turks. Turkish naval power, already strong in the Black Sea, grew in the Mediterranean at the expense of the Venetians, Genoese, and the Iberian states.

Piri assisted in transporting the Muslim and Jewish population in Granada from Spain to North Africa during the time of the *reconquista* of Spain by Ferdinand and Isabella. Sea battles Piri engaged in under his uncle included some at Valencia, Sicily, Sardinia, and Corsica. In the war with Venice between 1499 and 1502, he captained his own ship in a fleet commanded by Kemal Reis.

After his uncle died in 1510, Piri Reis returned to Gallipoli. There, in 1513, he constructed the first of his two world maps. Four years later, he commanded several ships that accompanied Grand Vizier Ibrahim Pasha (c. 1493–1536) to the city of Alexandria in Egypt, and he sailed with a portion of the fleet up the Nile to Cairo, where he presented his world map to Sultan Selim the Conqueror (1467–1520; reigned 1512–20).

Throughout his naval career, Piri Reis collected charts, made notes, and sketched maps of the islands and coastlines he visited. In 1521 he assembled these notes and charts into a book, *Kitab-i Bahriye*[3] (Book of the Sea, or Book of Maritime Matters).[4] Ibrahim Pasha learned of this book from Piri Reis and, realizing the value these notes might have to other Turkish sailors and to the Ottoman Empire, encouraged him to rewrite it in a form for presentation to the sultan.[5]

In 1526, Piri presented his revised *Bahriye* to Sultan Suleiman the Magnificent (c. 1495–1566; reigned 1520–66). This practical maritime manual and work of art has been called "the greatest Ottoman geographical compendium of the time" and a "magnificently opulent Renaissance coffee-table book."[6] It contains a long poetical prologue that may have been written by the court poet and historian Muradi from information supplied by Piri Reis.[7] In 1528, Piri Reis made another world map, which he also presented to the sultan. As with the map of 1513, the only portion to survive was part of the depiction of the Atlantic Ocean.[8] This second world map is based on a later model than that of the 1513 map. By 1547, Piri Reis was assigned to the Indian Ocean fleet, and he commanded the ships of the Red and Arabian Seas based at Suez.

In 1554, when he was in his late eighties, Piri Reis fell victim to the intrigues of the Ottoman court. Following his defeat in a sea battle with the Portuguese, it was reported to the sultan by officials in Egypt, where Piri Reis had come, that Piri Reis ran from the battle in order to save himself and his great treasure. This treasure was the accumulated spoils of his many decades of pirating with Kemal Reis and service in the Turkish navy. The sultan ordered him to be

beheaded because he avoided engaging the Portuguese in battle, and his treasures were taken to the Topkapi Serai Palace in Istanbul.[9]

Although a great name in Turkish naval history, Piri Reis is perhaps best known for his world maps and the *Bahriye.* This book was not printed until the twentieth century, but almost two dozen sixteenth-century manuscript copies of the two versions still exist today, although none of them are from the hand of Piri Reis.[10] The introduction of the second edition, written in verse, gives information on all aspects of navigation and maritime matters: the winds of the Indian Ocean and the Mediterranean Sea, the compass, how to determine latitude, how maps are made and used, oceanic geography, and the new geographical discoveries of the Spanish and the Portuguese. The main body of the book, written in prose, contains over two hundred maps and charts and gives detailed descriptions of all the islands, coasts, and ports of the Mediterranean Sea. He also describes the Atlantic Ocean and the new continent discovered by Spanish sailors on its western shore.

The *Bahriye* is part of the late medieval and early Renaissance tradition of the portolan, the manual of sailing directions or pilot book used in the Mediterranean. It is perhaps the most extensive and complete portolan.[11] Most of the place-names in Greece and the Aegean recorded by Piri Reis are Italian,[12] and he apparently used maps made by Italians.[13] The depictions of the islands and coasts of the Aegean Sea in the *Bahriye* are based on or copied from the *isolario* (book of islands) of Bartolomeo dalli Sonetti written around 1485.[14]

2 *Description of the Map*

The Piri Reis map of 1513 was discovered in 1929 by Bey Halil Ethem, director general of the Topkapi Serai in Istanbul, when that palace was being converted to a museum of antiquities.[1] He showed the map to Prof. Adolf Deissmann, who was then researching Greek and Latin manuscripts in the Serai Library. Deissmann, in turn, showed it to Dr. Paul Kahle, a noted German Orientalist who had previously published an incomplete transcription and translation of the earlier version of the *Kitab-i Bahriye.*[2] Kahle studied the document and presented his initial findings at the Eighteenth International Congress of Orientalists in Leiden on 9 September 1931.[3] Several published articles and a book by Kahle soon followed.[4]

The map itself is actually only the surviving western portion (about one-

third) of a larger world map, the remainder having been lost. The surviving portion, measuring about 90 cm × 65 cm, depicts the Atlantic Ocean with its islands and coasts and has many ships, animals, people, and inscriptions.[5] The inscriptions are written in the Arabic script. The language of the inscriptions (with one exception) is Ottoman-Turkish.

On the right side of the map are clearly shown the coastlines of the Brittany Peninsula of France, the Iberian Peninsula, the bulge of West Africa, the Azores, Madeira, the Canary Islands, and the Cape Verde Islands.[6] On the left side of the map are shown the coastline and bulge of South America, the Lesser Antilles, Puerto Rico, and what appears to be a confused depiction of Hispaniola, Cuba, the Bahamas, and Central America in the extreme northwest corner of the map. At the bottom of the map is a large continental landmass connected to South America. Presumably, the missing eastern portion of the map extended from Africa and Europe to China and the east coast of Asia. The omission of the British Isles, Iceland, Greenland, and Newfoundland from the surviving portion of the map and the blank strip along the top edge of the map where another vellum piece was attached indicate that the vellum containing these northern regions has also been lost.

The map is a portolan-style map. Portolan charts began as mariners' sea charts of the coastal regions of the Mediterranean, Aegean, and Black Seas during the thirteenth century, developing first among the Venetians and the Genoese and then among the Catalonians and Majorcans.[7] In the fourteenth century, they were extended to include the European coasts of the Atlantic. As new geographical information about Africa and later Asia and the New World was introduced onto the portolan chart, its basic pattern was expanded and applied to world maps to become what will be termed "portolan-style" or "extended portolan" charts and maps. The "extended portolan-style" maps of the sixteenth century were made in the style of traditional portolan charts, that is, compass roses, rhumb lines, etc., but they depicted areas outside the customary Mediterranean region. Examples of portolan-style world maps are the Juan de la Cosa map of 1500, the Cantino map of 1502, the Ribero world maps of the 1520s, and the Piri Reis map of 1513. Portolan charts of the Mediterranean region and portolan-style world maps continued to be made until the seventeenth century.[8]

Portolan charts are a type of sea chart designed to be of practical use to mariners by detailing coastal geography and sailing directions. They are characterized by an intersecting network of rhumb lines extending from a circular pattern of compass roses (also known as windroses). They lack indications of latitude and longitude, although the equator, the tropics of Cancer and Capricorn, and the Arctic and Antarctic Circles were often shown as the maps were

expanded to include tropical and arctic regions. The origin of the portolan chart is unknown. One theory is that they evolved from (or in conjunction with) the portolan, which gave sailing directions and coastal descriptions, along with bearings based on magnetic north, regardless of the variation of the compass. Portolan charts, unlike the earlier circular mappaemundi and schematic maps of the Middle Ages, are rectangular and usually oriented with north at the top, indicative of the nautical origin of the charts from the use of the magnetic compass. The lines radiating out from the compass roses are 16 or 32 in number, denoting the different winds and compass directions and again indicate the nautical origin of portolan charts.[9] The colors of rhumb lines or "winds" used by Piri Reis follow the standard practice used for portolan charts.[10]

The only place-names given on portolan charts, with few exceptions, are coastal features, such as ports and headlands. These place-names are written in red or black ink[11] at right angles to the coastline. Generally, inland names and features are omitted. The ordinary portolan chart used by the Mediterranean mariner usually lacked embellishments. The depiction of Europe and Africa on the Piri Reis map with the color and placement of the place-names and the illustrations plainly show it is derived from one or more portolan charts. Most of the extant medieval and early Renaissance portolan charts were made for merchants and nobles and are richly illuminated with embellished compass roses and illustrations of kings, coats-of-arms, cities, and animals, although some of the more utilitarian, less decorative charts used by mariners have also survived.

The Piri Reis map has two large compass roses, three smaller compass roses, and a partial network of rhumb lines (see fig. 2). The positions of these roses and lines indicate that there were originally sixteen alternating large and small compass roses in a large circle around a central compass rose, located in northeastern Africa.[12] This was a common design on portolan charts of this time. The diameter of the circle of compass roses was about 113 cm (45 in.).

The two large decorative compass roses each have a black arrowhead to indicate north, a practice first seen on the Catalan Atlas in c. 1380,[13] followed by subsequent mapmakers, and continued to the present.[14]

The original world map probably measured about 140 cm (55 in.) high and at least 165 cm (65 in.) wide and most likely also included the British Isles, Iceland, Greenland, and Newfoundland, the remaining portions of Europe and Africa, and all of Asia eastward to China and the East Indies. The entire world map may have had the appearance given in fig. 3.[15]

Most reproductions and illustrations of the Piri Reis map do not take into account the north-pointing arrows of the two compass roses and, therefore,

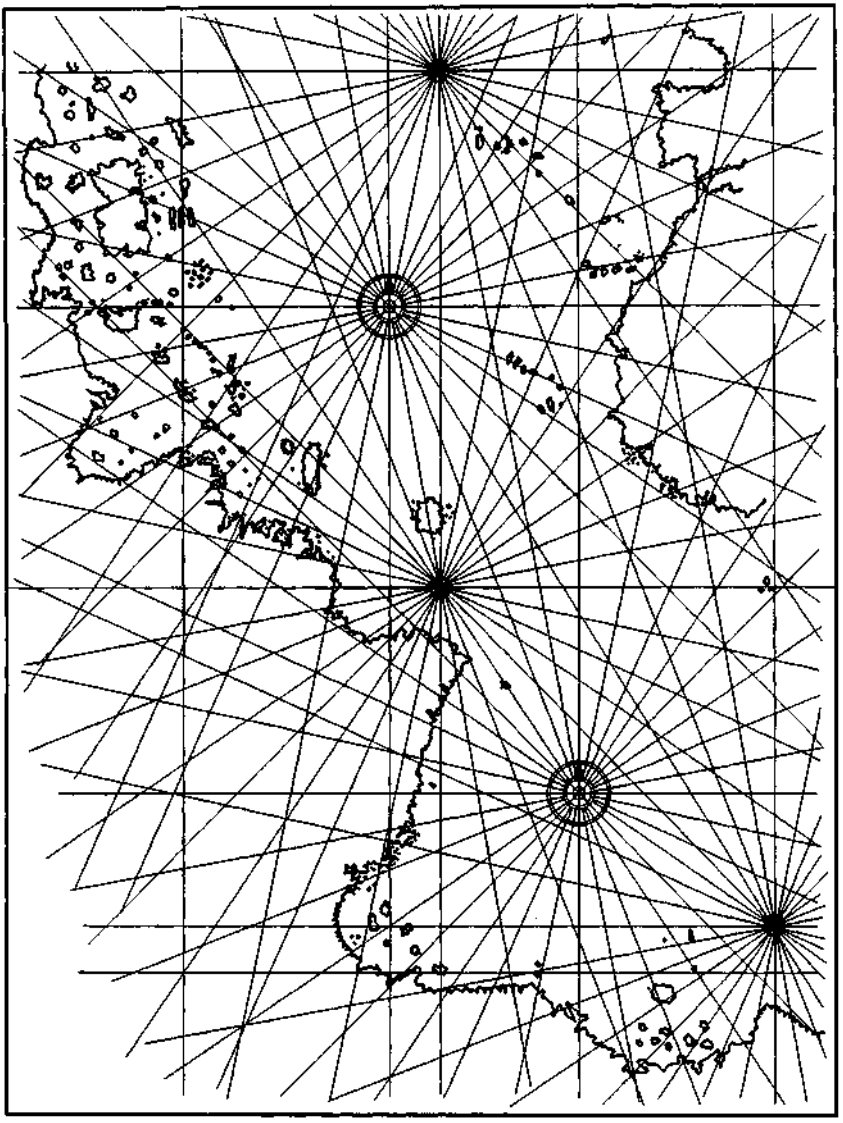


Figure 2. Rhumb lines and compass roses of the Piri Reis map.

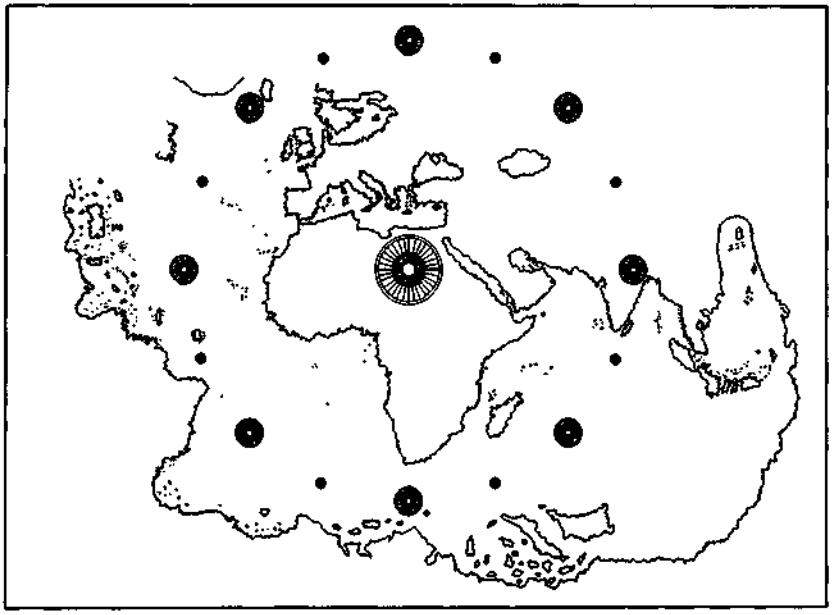


Figure 3. A suggested reconstruction of the whole Piri Reis map of 1513.

the proper orientation of the map.[16] Rather, the map is usually oriented to its torn top edge and is depicted skewed approximately 3 to 5 degrees clockwise.[17]

The east-west line running through the uppermost large compass rose in the North Atlantic appears to be coincident with the tropic of Cancer.[18] It crosses the coast of Africa at the appropriate place at Punta Dunford. The east-west line running through the middle compass rose, almost in the exact center of the map, is coincident with the equator; it passes through the Gulf of Guinea at the appropriate distance from the coast of Africa. Presumably, the east-west line running through the lowermost large compass rose in the South Atlantic is coincident with the tropic of Capricorn.[19] Except for these two tropic lines and the equator, there are no other indications of latitude on the Piri Reis map. Although latitude scales were common to Ptolemaic maps, portolan charts of the thirteenth, fourteenth, and fifteenth centuries did not contain latitudes. Latitudes were added to extended portolan-style maps in the sixteenth century. Indications of the equator, the two tropic lines, and the Arctic and Antarctic Circles were sometimes shown, however, before latitudes were generally added to portolan charts, such as on the portolan-style La Cosa map of 1500 and the Cantino map of 1502. Other portolan-style maps that locate a compass rose on

the equator or the two tropic lines are the Salviati map of c. 1526 and some of the maps by Battista Agnese in his atlases of 1542–50.

Typical for maps of the early sixteenth century, the scale of the New World is much larger than that of the Old World.[20] Hence, on the Piri Reis map, although the tropic of Cancer is properly located in the Old World at Punta Dunford in present-day Western Sahara, in the New World the tropic of Cancer passes through Puerto Rico rather than further north through the Bahamas, as it does in actuality. It was not unusual for maps of the early sixteenth century, such as the La Cosa and Ruysch maps, to show the tropic of Cancer passing through or very near Puerto Rico. Similarly, the tropic of Capricorn, apparently properly located in the Old World on the Piri Reis map, passes through *Abraklok* (i.e., Abrolhos, the shoals and reefs at present-day Ponta de Baleia on the coast of Brazil) in the New World rather than further south near Cabo Frio and Rio de Janeiro. The equator, however, as with all early sixteenth-century extended portolan maps, is properly located in the Old World and in the New World at or near the mouth of the Amazon.[21] The effect of this larger scale in the New World is that points north of the equator are located further north in relation to Europe and points in the New World to the south of the equator are located further south in relation to Africa (see fig. 4).

This same effect of a larger New World scale can be seen on other early maps, such as the La Cosa map of 1500, the Cantino map of 1502, the Waldseemüller maps of 1507 and 1513, the Maggiolo map of 1511, and the Schöner Globe of 1520. This error of depicting the New World on a scale larger than the Old World has been noted and discussed by historians of cartography.[22] This error seems to have been corrected by the Spanish following the Congress (or Junta) at Badajoz in 1524, as seen on the Salviati world map of c. 1525–26 and the maps by Diogo Ribeiro (Diego Ribero), which probably represent the Padrón General, the official map of the Spanish government.[23]

To the west of Europe in the North Atlantic and to the west of Africa in the South Atlantic are depicted two league scale bars, a common feature of portolan charts.[24] Based on the distance from Cape St. Vincent to Cape Finisterre on the Iberian Peninsula being about 6° of latitude (37° and 43° respectively) and each division on the two league scales being equivalent to 10 leagues (standard cartographic practice of the time), each division is about 17½ leagues per degree. This is one of the typical estimates of the length of a meridian degree used by many geographers, cartographers, and cosmographers at the time. This degree length was the one derived from Eratosthenes. Other estimates of the length of the meridian degree at the equator current in the early sixteenth century were 16⅔ leagues per degree and 15⅔ leagues per degree.[25] This last, the

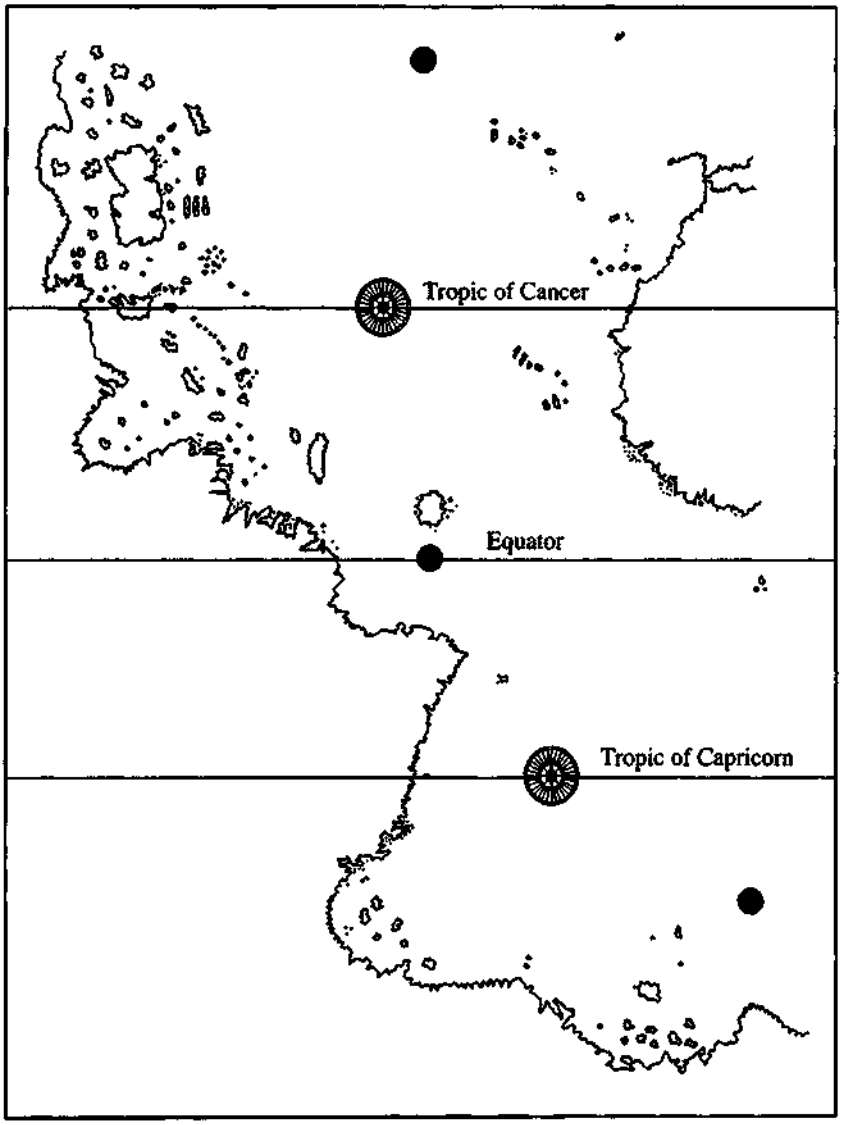


Figure 4. The equator and tropic lines on the Piri Reis map.

smallest estimate of the earth's size, was that of Ptolemy and the one accepted by Columbus.[26] The true length of the meridian degree is 18⅔ leagues.

Various landmarks and sailing hazards were indicated on portolan charts with conventional graphic signs, such as crosses for rocks and reefs and red dots for shallows and sand banks.[27] In the *Bahriye,* Piri Reis says that reefs are marked with black dots, sandy shallows with red dots, and hidden shoals or reefs with small crosses.[28] Piri Reis has followed these same mapmaking conventions on his map. As was traditional with portolan charts, important place-names and islands on the Piri Reis map are colored red.

The inscription numbers given herein are not themselves on the map and are created for reference purposes only. They refer to fig. 5, which indicates the location of each inscription on the map. The numbering of the inscriptions follows that used by Akçura and Afetinan, except for the addition of a few newly translated inscriptions, nos. 25 through 30, which they had omitted. The translations are based primarily on those by Akçura and Afetinan as well as those by Kahle, Marvel, Lunde, and Goodrich.[29] I have altered Akçura's punctuation where necessary to conform to current standards, and I have silently corrected typographical errors. The numbering of the inscriptions used by Kahle, Akçura, Hapgood, and other writers on the Piri Reis map has not been uniform. A table of concordances between the differing numbering systems for the map inscriptions is given in appendix B.

All but one of the inscriptions and place-names were written on the map by a professional calligrapher. That one inscription, no. 4, written in Arabic in a different hand, presumably by Piri Reis himself, states:

> 4. This map was drawn by the poor man Piri son of Haji Mehmet and the nephew of Kemal Reis—may Allah have mercy on them both—in the town of Gelibolu, in the month of Muharram of the year 919.

Gelibolu is present-day Gallipoli, the probable birthplace of Piri Reis. The date is equivalent to between 9 March and 7 April 1513 C.E.

Inscription no. 6, located on South America, gives information on the source maps Piri Reis used in compiling his world map.

> 6. This section shows in what way this map was drawn.
>
> In this age, no one has seen a map like this. The hand of this poor man [i.e., Piri Reis] has drawn it and completed it from about twenty charts and mappaemundi. These are charts drawn in the days of Iskender dhu-l Karnian, which show the inhabited quarter of the world. The Arabs name these charts Jaferya. From eight Jaferyas of that kind and one Arabic map of Hint, and from four newly

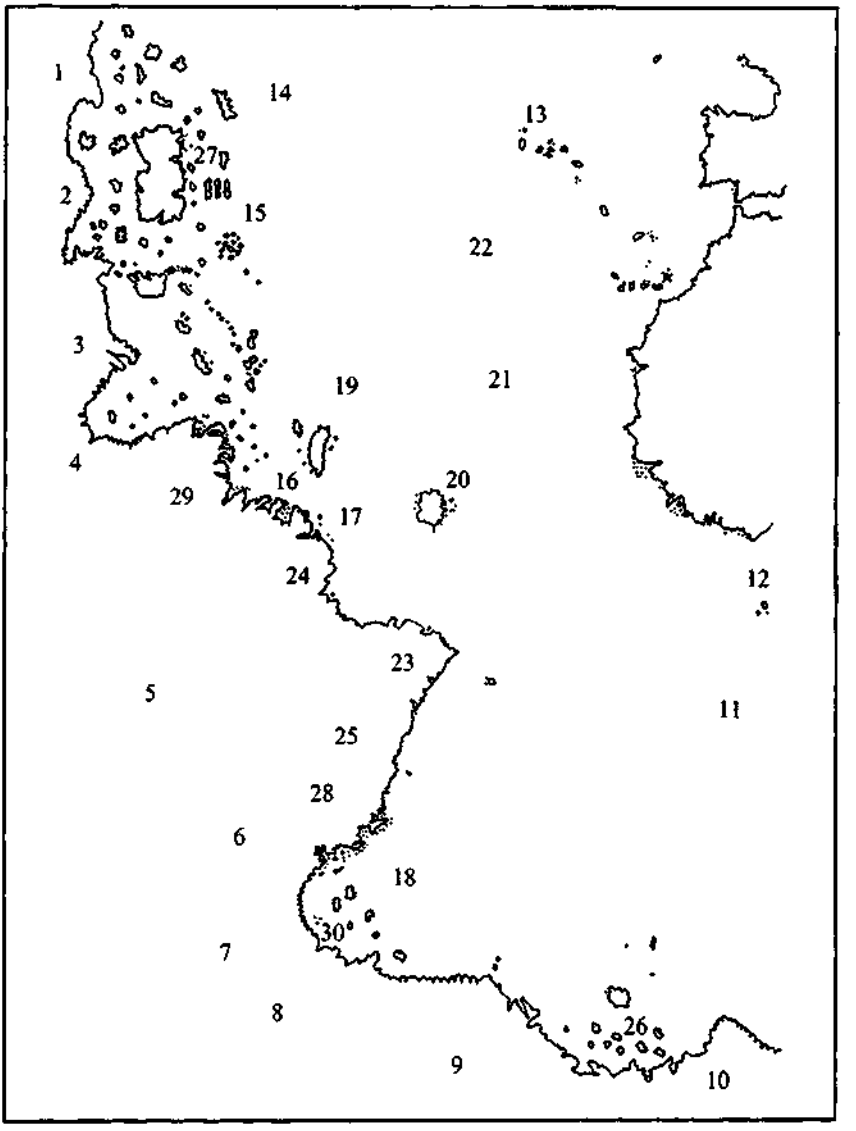


Figure 5. Key map of inscriptions.

drawn Portuguese maps which show the countries of Sint, Hint, and Çin geometrically drawn, and also from a map drawn by Qulūnbū in the western region, I have extracted it. By reducing all these maps to one scale this final form was arrived at, so that this map of these lands is regarded by seamen as accurate and as reliable as the accuracy and reliability of the Seven Seas on the aforesaid maps.

Qulūnbū is the modern transliteration of the name in the inscription. It is, of course, Colonbo, that is, Christopher Columbus (c. 1451?–1506). The assertion by Piri Reis that he used a map by Columbus in making his own map is repeated in the *Kitab-i Bahriye.*[30]

Although in modern use the term *mappamundi* (plural *mappaemundi*) is used to designate a schematic Christian world map of the Middle Ages, usually circular in shape, there are instances from the twelfth century to the fifteenth century of the term being used for any map and for maps in general.[31] It is possible that what Piri Reis meant by *mappaemundi* was this broader definition, or he may have meant maps of the world, which is the literal meaning of the term.[32]

Iskender dhu-l Karnian, or Alexander, Lord of the Two Horns, is the Alexander the Great of medieval European and Islamic legend. Arab writers often confused Claudius Ptolemy, the geographer of the second century C.E., with Ptolemy I, one of Alexander's generals and the first Ptolemaic ruler of Egypt, who reigned from 323 to 285 B.C.E.[33] Piri Reis has undoubtedly made the same error, resulting in his believing the charts and maps were from the time of Ptolemy I instead of Claudius Ptolemy. Maps based on the geography of Claudius Ptolemy were widely printed from the late fifteenth century onwards and were undoubtedly available to Piri Reis. As will be shown in the later discussion on the Southern Continent, this then common mistake of confusing Claudius Ptolemy with Ptolemy I has resulted in some modern researchers attributing a much greater age to Piri Reis's source maps than is justified.

The inhabited quarter of the world, that is, the world from the Canaries to Southeast Asia, called *oikoumene* by the ancient Greeks, was the area of the world depicted on Ptolemy's maps, which was Europe, the Mediterranean Sea, Africa north of the tropic of Capricorn, Asia to beyond the Malay Peninsula, and the Indian Ocean. Hind (India), Sind (western India, i.e., Pakistan), and Zinj (eastern Africa) are the three divisions of the Indies according to the Arabs.[34]

Piri Reis or his calligrapher has misspelled the word *jografiya* (from the Greek *geographia*), meaning the maps from the *al-Jughrāfiyā* or *Geographia* of Claudius Ptolemy, as *jaferya* or *ca'feriye.*[35] The *Geographia* of Ptolemy is a compilation of the latitudes and longitudes of hundreds of localities in the *oikou-*

mene. The manuscript and printed Ptolemaic maps from the Middle Ages and the early Renaissance, which would have been available for Piri Reis to use, are copies of copies, ultimately derived from either regional maps made by Ptolemy himself in the second century C.E., from the world map made by Agathodaimon sometime between the second and sixth centuries C.E., from maps constructed by Maximus Planudes in the late thirteenth century, or from maps made by Nicephoras Gregoras in the early fourteenth century.[36]

Piri Reis indicates that the depictions of India and China (which were shown on the lost portion of the map) were based on four Portuguese maps.[37] Portuguese voyages to these regions had just begun (India in 1498 and Southeast Asia, the South China Sea, and the East Indies in 1509), so we do not know to what extent the Portuguese maps were based on the experience of their explorations, on information received from Arab, Indian, Javanese, and Chinese traders, or on traditional Ptolemaic delineations.

There appears to be some disagreement among scholars as to whether the twenty maps and mappaemundi mentioned in the inscription included the eight jaferyas and the four Portuguese maps. Some have interpreted the passage to mean that there were a total of twenty maps.[38] Others have thirty or, by adding the eight jaferyas and the four Portuguese maps to the twenty, arrive at a total of thirty-four.[39]

Some modern writers have asserted that Piri Reis used maps found in the ancient library of Alexandria, although he never makes such a statement in any of the map inscriptions or in his writings in the *Bahriye.* This modern, unfounded claim seems to have its origin in this inscription, which mentions Alexander, founder of the city of Alexandria, and alludes to both Ptolemy I, who lived and ruled in Alexandria in the fourth century B.C.E., and Claudius Ptolemy, the geographer and mapmaker, who lived in Alexandria in the second century C.E.

The Seven Seas mentioned in this inscription are identified by Piri Reis in the *Kitab-i Bahriye* as the Chinese Sea, the Indian Sea, the Persian Gulf, the Sea of the Blacks (the sea around the island of Zanzibar in East Africa), the Caspian Sea, the Western Sea (the Atlantic Ocean), and the Red Sea.[40]

3 *Europe and Africa*

There are 117 place-names on the map. Most of these are easily identifiable and were undoubtedly copied by Piri Reis from typical European-made portolan charts and portolan-style maps of his time. On the source maps, most of these place-names were originally written in European languages, such as Italian and Portuguese, although some in the western regions have Native American place-names, preserved by the Spanish, as will be seen. On the European source maps used by Piri Reis, these were written in the Roman or Latin alphabet. Piri Reis and his calligrapher transliterated these into the Arabic script on the map. For our purpose in this book, the names are transliterated back into the Roman alphabet. Variations in spellings are the result.

In the following seven tables, the place-name is given, as transliterated from the map, along with its probable contemporary equivalent and modern location. When the place-names from the Piri Reis map are referred to, they are given in *italics*. Many of the place-names on the Piri Reis map are listed in tables and identified by a letter prefix keyed to figs. 6, 7, and 8 to indicate their location on the map. Three of the place-names—*Antilia* (key letter W), *Undiziverjine* (NN), and *Antilia* (AQ)—are given within inscriptions 3, 15, and 16.

Most of the spellings and capitalizations of the place-names are those made by Akçura. In modern Turkish orthography, which Akçura used, the *j* sound, as in the English word *jam*, is written with a *c*, and the *w* sound of the English word *we*, when following a vowel, especially in foreign words, is written with a *v*. To avoid confusion, the English *j* and *w* are used for these sounds. Hence, the Spanish place-name San Juan, which was rendered in modern Turkish orthography by Akçura[1] as *Sancuvan*, is for our purpose in this book spelled *Sanjuwan* to more closely reproduce the Turkish pronunciation for English-speaking readers. Other standard letters in modern Turkish, however, such as ç, which represents the *ch* sound of English, have been retained.

Brest, a toponym that has survived to the present, previously occurs on portolan charts, including those of Petrus Vesconte and Andrea Bianco and the Catalan Atlas.[2]

In west Africa are shown rivers, lakes, mountains, cities, animals, and seated figures that are similarly shown on earlier portolan charts, such as that by Angelino Dulcert of 1339, the Catalan Atlas of c. 1380, and that by Mecia (or Macian) de Viladestes of 1413. One of the two seated figures shown in west Africa is probably the king of Mali, Mansa Mūsa, who reigned from c. 1312 to 1337 and whose wealth so impressed Europeans that he was commonly depicted on portolan charts from the mid-1320s onward seated on a throne holding an orb and a scepter.[3] Beside the depiction of him is the inscription *Padişah-i Kine* (ruler of Guinea). The other seated figure has next to it the inscription *Merakiş padişah-i* (ruler of Marrakech).[4]

The density of the place-names varies in the different regions and continents on the Piri Reis map. The coast of Africa has considerably more place-names than the other continents and lands shown. Generally, the place-names on portolan charts are in a tight regular sequence along the coasts, such as is exhibited here on the African coast.

Only a few of the many African coastal toponyms are given herein, which are from the standard repertory of coastal toponyms of Africa on portolan charts and portolan-style maps of the late fifteenth and early sixteenth centuries. Some of the African place-names given in table 1 are Turkish translations

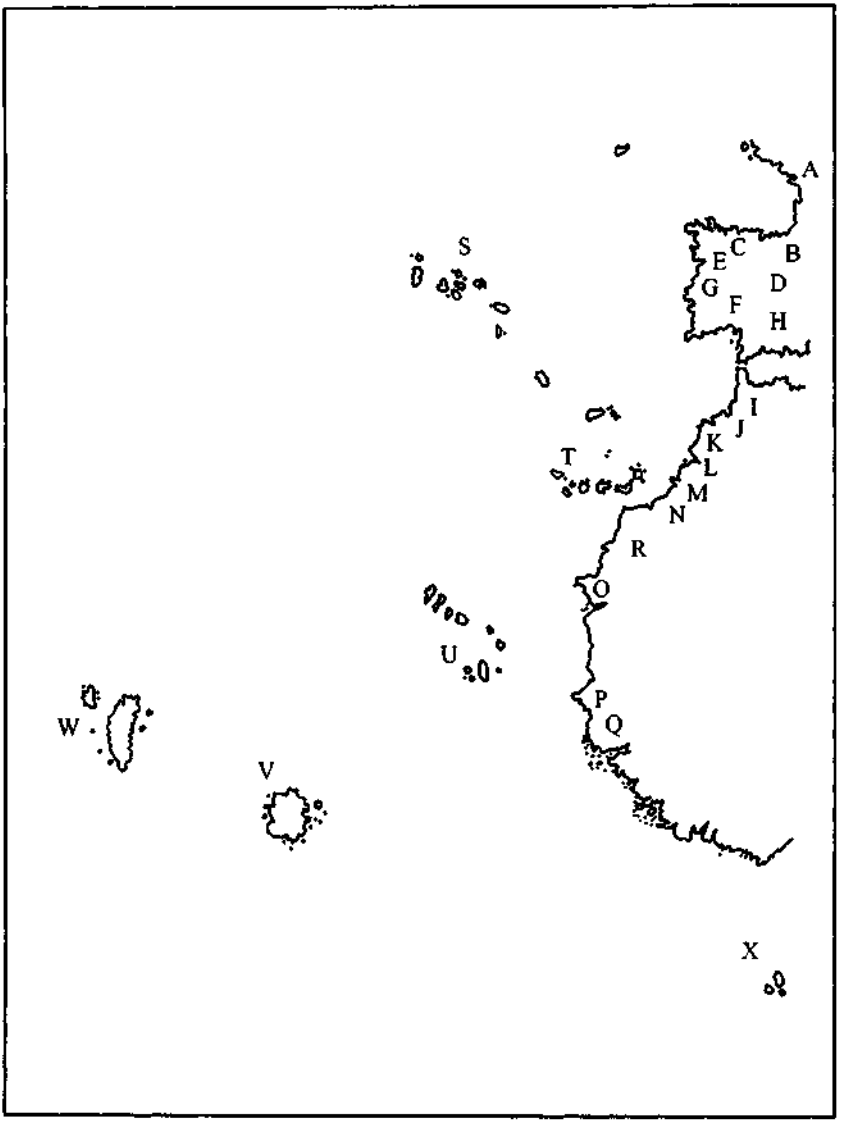


Figure 6. Key map of place-names in Europe, Africa, and the Atlantic islands.

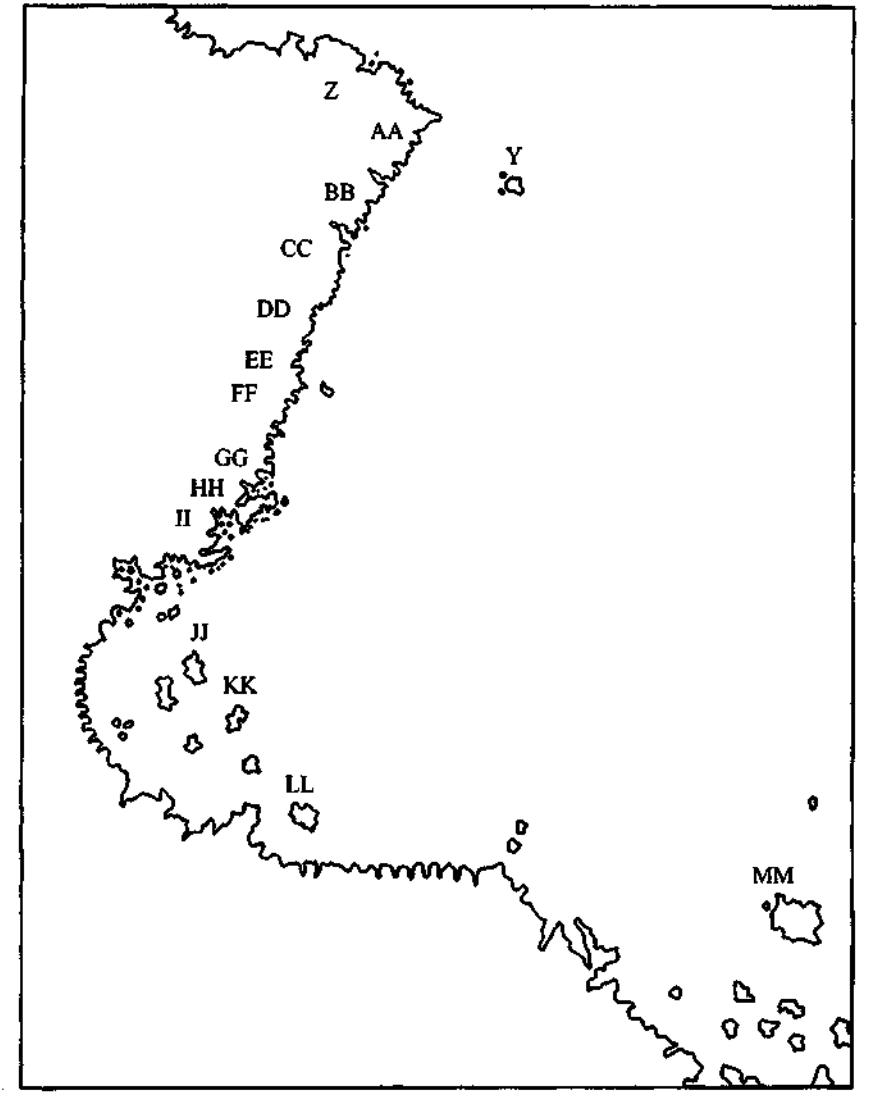


Figure 7. Key map of place-names in South America.

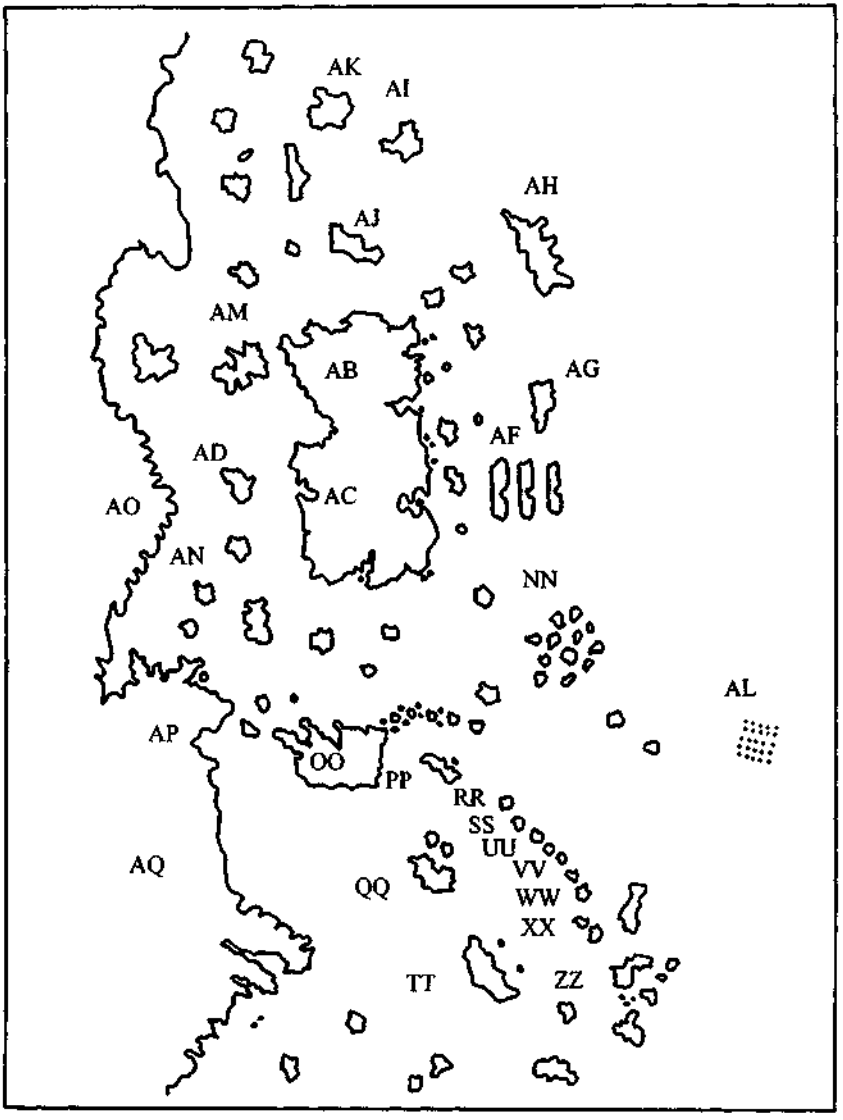


Figure 8. Key map of place-names in the Caribbean.

Table 1. Some Place-Names in Europe and Africa

Key Letter	Transliteration from the Map	Probable Identification
A	*Brest*	Brest
B	*Bilad-i Ispanye*	Spain
C	*Galiziya memleketi*	Galicia
D	*Baskin*	Basques
E	*Taht-i Portakal*	Throne of Portugal
F	*Portukal kenari*	Border of Portugal
G	*Lizbon*	Lisbon
H	*Kunata*	Granada*
I	*Melile*	Melilla
J	*Sali*	Salé
K	*Nebfe*	Nafe (Anafe), i.e., Casablanca
L	*Camur*	Azamor**
M	*Mugadire*	Mogador
N	*Mese*	Massa
O	*Akburnu*	"White Cape," i.e., Cabo Blanco
P	*Yeshil burnu*	"Green Cape," i.e., Cabo Verde***
Q	*Altun irmagi*	"River of Gold," i.e., Rio de Oro
R	*Bozabur burnu*	Cape Bojador

* Konyali, *Topkapi Sarayinda*, 84.

** The author wishes to thank James E. Kelley Jr. for identifying the place-names of *Sali*, *Nebfe*, and *Camur*, as Salé Anafe or Nafe, and Azamor.

*** Piri Reis used both Yeşilburun and Kavu Verde. See Piri Reis, *Kitab-i Bahriye* (1988), 121.

by Piri Reis of place-names commonly shown on portolan charts of the fourteenth and fifteenth centuries. The fabled Rio de Oro was believed by Europeans to be the source of gold in west Africa and was probably a confusion by Europeans of the Wad Draa, Gambia, Senegal, Volta, and Niger Rivers.[5] Its first appearance on a map was a reference in a note on a chart by Dulcert of 1339.[6]

In the Gulf of Guinea is half of a five-lined inscription:

12. . . . on this shore a tower
. . . is, however,
. . . in this climate gold
. . . taking a rope
. . . is said they measured.

The missing halves of these lines were on the lost eastern part of the map. From the position of these lines in relation to Africa, the tower (*kule* in Ottoman-Turkish) is probably the fortress or castle (*kale* in Ottoman-Turkish) that the Portuguese erected at Elmina in the Gold Coast, located near these five lines, and usually depicted on Portuguese maps as a great fortress. Or perhaps it refers to one of the *padrões*, or stone columns (*kolon* in Ottoman-Turkish), that the Portuguese erected along the coast of Africa during their voyages and depicted on their maps of the African coasts.[7] The mention of climate and gold must refer to the belief of ancient and medieval geographers that gold was to be found in warmer, or tropical, climates, due to the effects of the sun's rays.

To the south of the Gulf of Guinea in the Atlantic is the following inscription:

> 11. And these four ships are Portuguese ships. This drawing shows their shape. They traveled from the lands in Mağrip to Habeş. In order to reach Hinde [India] they sailed toward the southeast. The distance across this gulf is 4,200 miles.

One of the four ships is shown next to this inscription. The remaining three must have been shown sailing south along the west coast of Africa and around the Cape of Good Hope toward India on the portion of the map that is lost. The voyage referred to may be the first voyage of Vasco da Gama (c. 1460–1524) from Portugal to India between 1497 and 1499,[8] which utilized four ships. A similar depiction of Portuguese ships is on other early maps, such as the La Cosa map and the Jorge Reinel chart of the Indian Ocean of c. 1510.

Although it is not usual for extended portolan-style maps of the time to depict ships sailing the seas as decorative objects, the Piri Reis map has more ships than is typical. There are ten ships—carracks, barques (or barcas or barks), caravels—and these are important to our understanding of contemporary ships.

Mağrip or Magrib (meaning "region of the setting sun" or "west") is the Arabic and Ottoman-Turkish name for all of north Africa, including Morocco and the Barbary Coast but excluding Egypt. Habeş, or Habesh, is the Arabic name for Abyssinia or Ethiopia and the Horn of Africa and east Africa along the Indian Ocean.

4 *The Atlantic Islands*

Typical of portolan charts of the fifteenth and sixteenth centuries, the major island groups of the Atlantic—the Azores, the Canaries, and the Cape Verde Islands—are shown and named on the Piri Reis map along with other real and imagined islands. The islands of Madeira, Porto Santo, and the Deserta Group are also shown but not named. An unidentified island is shown midway between the Azores and Madeira that may be one of the legendary islands, such as St. Brendan's Isle, Capraria, or Lobo, often shown in this location on fifteenth-century portolan charts.[1] A small, unnamed island is also shown near the top of the map, due west of the Brittany Peninsula of France. This undoubtedly is the legendary island of Mam or Mayda, shown in this position on many maps of the fifteenth through twentieth centuries.[2]

Most of the names of the Azores are easily identifiable. They have retained the names given to them by the Portuguese in the fifteenth century. The present-day island of Pico was named Opico or Epiko on fifteenth- and sixteenth-century maps, such as the King-Hamy-Huntington map of c. 1503, an Italian copy of a Portuguese map. *Kopis* is undoubtedly Copras, Cabras, Cabrera, Capraria, or Chapusa. Capraria, from the Latin capra (goat), was originally located in the Canaries, or Fortunate Isles, by Pliny.[3] On medieval portolan charts it was sometimes located in the Azores,[4] such as on the fourth chart of the 1436 atlas by Andrea Bianco, as Piri Reis apparently has done, or sometimes between the Azores and the Canaries, as on the charts of Battista Beccario of 1426 and 1435, Grazioso Benincasa of 1468 and 1482, and Bartolomeo Pareto of 1455. However, on the surviving portion of the world map made by Piri Reis in 1528, the names given to the islands of the Azores are *Santa marya, San mikal, Epico,*[5] *San jorjo,* and *Oskolores* (Flores).

The island of *Elferno* in the Canaries is the present-day island of Tenerife. It was sometimes given the name Inferno on portolan charts, such as the Andrea Bianco map of 1448, in reference to the volcanic Mt. Tenerife.

It appears that on the Piri Reis map the names for Palma and Ferro have been reversed, and some of the other place-names have "migrated" to nearby features. This is not unusual on maps made in the fifteenth and sixteenth centuries.

Ileciyanko, one of the Cape Verde Islands identified as Sao Vicente in table 2, may not be Sao Vicente. Bräunlich has read the name as either *Ile Branco* or *Ile Bianco.*[6] Branca is a name for one of the Cape Verde Islands appearing in the earliest Portuguese documents referring to these islands.[7] As Brava it appeared on many early maps, such as on the chart of c. 1511–13 of West Africa and the Cape Verde islands by Francisco Rodrigues. Bräunlich's alternative reading of *Bianco* may have been influenced by the name of Andrea Bianco, the famous Venetian cartographer of the mid-fifteenth century. It is not impossible that this cartographer's name became a place-name by mistake, which was copied by Piri Reis. In Africa on the Leardo map of c. 1453 is the place-name *uilodesci,* which is so much like that of the cartographer Mecia de Viladestes that it has been supposed that his signature from one of his maps from the beginning of the fifteenth century somehow became a place-name on the Leardo map.[8]

Next to the Azores is the following inscription:

> 13. And a Genoese bark coming from Flanders was caught in a storm. Impelled by the storm it came upon these islands, and in this way these islands became known.

This inscription repeats one of the traditional tales about how the Azores were discovered. The facts regarding the discovery and rediscovery of the

Table 2. Island Names in the Atlantic Ocean

Key Letter	Transliteration from the Map	Probable Identification
S (Azores)	*Santa marya*	Santa Maria
	San mikal	San Miguel
	Izle flores	Flores
	Eviko	Opico or Pico
	Finoci	Graciosa?
	Firgal	Fayal
	Kopis	Copras, i.e., Capraria
T (Canary Is.)	*Lenserto*	Lanzarote
	Ventore	Fuerteventura
	Ile de kanarye	Grand Canary
	Elferno	Inferno, i.e., Tenerife
	Gomara	Gomera
	Palme	Palma
	Ile fero	Ferro, i.e., Hierro
U (Cape Verde Is.)	*Sen tiyono*	Santo Antão or San Antonio
	Ileciyanko	Sao Vicente?
	Ileci	Santa Lucia or Santa Luzia
	Dosalo	Sale or Sal
	Sen Nikola	Sao Nicolau
	Bomiste	Boa Vista
	Emaye	Maio
	Sigogo	Sao Tiago
	Brava	Brava
	Rosigo	Raza, Fogo & Segos Is.?
V	*Izle de Vaka*	Salvaga?
W	*Antilya*	Antilia
X	*Sanmetiyos*	San Mateus

Azores are unknown. They may have been visited by the Arabs and Italians before their "official" discovery by the Portuguese in 1427. One tradition is that they were discovered by the Genoese in the fourteenth century. Another tradition holds that Van der Berg, a man from Flanders, was driven by a storm to these islands in 1432 and the Portuguese followed up on the discovery. Because many of the earliest colonizers were Flemish, the Azores were also known as the Flemish Islands.[9]

As for the reference to a Genoese bark, in the fourteenth and early fifteenth centuries the Genoese and the Venetians were the leading maritime nations of Europe in the Atlantic until they were eclipsed by the Portuguese. Beginning in the early fourteenth century, the Portuguese hired and used the more experienced Genoese as commanders for their ships. The first hereditary admiral of the Portuguese navy was a Genoese, and a Genoese headed the Portuguese expedition to the Canary Islands in 1341, which included Italians and Castilians.[10] The Genoese are mentioned in some of the map inscriptions: 5, 13, 21, and possibly 17 and 20. The Portuguese are mentioned in inscriptions 6, 7, 8, 9, 11, 18, 19, and 21.

It is interesting that in six map inscriptions (8, 13, 17, 18, 20, and 21) storms are given as the cause for the discoveries of the Azores, one of the Cape Verde Islands, *Izle de Vaka* (Isle of Vaca), and two regions in South America. The only accidental discoveries (or rediscoveries), all by Portuguese, attributed by fifteenth- and sixteenth-century Europeans to storms on either side of the Atlantic south of the Strait of Gibraltar were Porto Santo and Madeira in 1419,[11] the Cape Verde Islands in 1454,[12] Brazil in 1500,[13] and the legendary islands of Antilia before 1460[14] and of the Seven Cities in 1447.[15]

Next to a depiction of a lateen-rigged ship and the Cape Verde Islands is the following inscription:

> 21. The master of this caravel is called Messire Anton the Genoese, but he was brought up in Portugal. One day, this caravel encountered a storm and was driven upon this island. He found much ginger here and was the first to write about these islands.

This probably refers to Antonio da Noli (or de Nolle) the Genoese, who, with his brother Bartolomeo and nephew Raphael, was employed in the service of the Infante Dom Henrique (Prince Henry the Navigator, 1394–1460) and the Portuguese.[16] They may have been related to Agostino da Noli, who made maps in Genoa in the 1430s.[17] In 1460, about five years after some of the Cape Verde Islands were first discovered, Antonio da Noli found others and began their colonization. The Cape Verde Islands were commonly known as the "Isles of Antonio" (as in testimony given by Pedro Ramírez in 1515 regarding the voyages of Vicente Yáñez Pinzón),[18] and Antonio da Noli was commonly given credit on early maps for the discovery of these islands (e.g., the Juan de la Cosa map of 1500 and the Paris map of c. 1489 to c. 1500). The ginger referred to may be asarabacca, which grows in the Cape Verde Islands and which the early European voyagers may have mistaken for ginger.[19]

The following inscription is next to the legendary island of Antilia:

16. And this island they call the island of Antilia. There are many wild beasts [monsters] and parrots and much logwood. It is not inhabited.

The legendary island of Antilia was often shown on portolan charts of the fifteenth century, but was usually shown to the west of Europe, not to the west of Africa, as on the Piri Reis map. Its earliest confirmed appearance is on the Pizzigani portolan chart of 1424.[20] It occasionally appeared on sixteenth-century maps, such as that drawn by Giorgio Calapoda in 1560.[21] Logwood (*Haematoxylon campechianum*), also known as dyewood, brazil, brazilwood, verzino, and vakami, was an important early product of the New World imported into Europe.

The following inscription is next to the northeast coast of South America:

17. This bark was driven upon these shores by a storm and anchored where it came to lay. The name [of the commander of the ship] was Nikola di Juwan. On his map it is written that these rivers, which can be seen, are mostly gold dust. When the water had run off, they collected much gold dust from the sand. He has written it in his map.

One of the legendary stories told about Antilia and the Island of the Seven Cities involved shipwrecked sailors who obtained gold or silver from sand.[22] This was also noted on the Paris map of c. 1489 to c. 1500.[23] The identity of Nikola di Juwan (Nicolo de Juan? Nicolo of Genoa?) and his map has not yet been ascertained.[24]

Next to a mid-Atlantic island is the following inscription:

20. And this caravel having encountered a storm was driven upon this island. The [commander of the] caravel was named Nikola Juwan. And on this island there are many oxen with one horn. For this reason they call this island Izle de Vaka, which means Cow Island.

There is no record of an Isla de Vaca or Cow Island on medieval portolan charts. There were undoubtedly many voyages to the New World in the sixteenth century that are lost to recorded history. This may be one of them. The one-horned oxen may be the legendary monoceros, depicted on South America on the Piri Reis map and discussed below in chapter 5. In the twelfth century, however, a large island in the Dark Sea (Atlantic Ocean) named "al-Ġaur" was described by Edrisi as having wild oxen with unusually long horns.[25]

On the Francisco Rodrigues chart of west Africa and the Cape Verde Islands of c. 1511–13, there is an island, Ilha dacemçam, shown in the same position as Izle de Vaka. Because Piri Reis used Portuguese maps in making his

own map, the position of Ilha dacemçam may have influenced his depiction of Izle de Vaka.

Perhaps the name Izle de Vaka is related to Salvaga, an imaginary companion island to the legendary island of Antilia, often shown on portolan charts, such as the Battista Beccario chart of 1435.[26] The name has survived to the present as Salvages, Selvagens, or Savage for the group of three small islands midway between Madeira and the Canary Islands. On the Bartolomeo Pareto chart of 1455, the Insulle saluagie occur in their present-day location. On the Grazioso Benincasa chart of northwest Africa of 1468, Saluaga and Saluage are both shown as islands between Madeira and the Canaries. Perhaps a portolan chart with Y salvaga or ysalvaga was misread by Piri Reis as Ysla vaga (Isla Vaca).

Perhaps the name Izle de Vaka is derived from Mar de Baga, or Sea of Weed, the Portuguese name for the Sargasso Sea, which occurs on two mid-fifteenth-century charts by Andrea Bianco. Other somewhat similar place-names used in this region of the Atlantic on maps of this period are Fogo, one of the Cape Verde Islands, and Lobo (also Lopo, Lovo, Louo, Ovo, etc.), a name used for the imaginary companion island of Capraria, as an early Italian name for Santa Maria in the Azores,[27] and as the present-day Lobos islands in the Canaries.

It is possible that the island name Izle de Vaka or Cow Island came from a misreading of a map inscription. On the Behaim Globe of 1492 next to Antilia is an inscription describing how seven Portuguese bishops fled by ship to Antilia in the year 734 to escape the Moorish invaders. The inscription states that they fled with other Christians, their cattle, and other property.[28] It is possible that Piri Reis misread this or a similar inscription, which resulted in two islands being depicted in the Atlantic—Antilia and Cow Island.[29]

The small group of islands in the Gulf of Guinea labeled *Sanmetiyos*[30] is San Mateus, or St. Matthew's Island, a legendary island first reported by the Portuguese, apparently in the late fifteenth or early sixteenth century. It was commonly shown in the Gulf of Guinea on maps until the nineteenth century.[31] It was usually shown as a single island. The reported year of the "discovery" of the nonexistent island of San Mateus as 1516, as stated by some modern authorities, must be incorrect, however, because the island and its name occur here on the Piri Reis map three years earlier.[32]

These same authorities attribute the origin of this legendary island to an error in longitude. They suppose one of the islands in the Gulf of Guinea, such as Annobon Island at 1°24′ S latitude and 5°35′ E longitude, was mistakenly reported to be at West longitude, and thus it was duplicated as San Mateus. San Mateus, or St. Matthew's Island, was variously reported at 2° S, 8° W;

1°50′ S, 6° W; and 1°30′ S, 6°1 W.[33] This supposed origin of St. Matthew's Island must be incorrect, however, because the prime meridian, or zero longitude from which all other longitudes are measured, was not in the sixteenth century where it is now. In the sixteenth century the prime meridian most often used (there was no official standard) was the meridian that ran through Ferro (modern Hierro), the westernmost island of the Canary Islands.[34] It was not until the late seventeenth century that the meridian of London was first used, and the present prime meridian through Greenwich, England, was not agreed upon until 1884. The specific origin of this legendary island remains a mystery, but undoubtedly it arose during the Portuguese voyages in this region after 1460. The Volta da Mina, or route from Elmina, the Portuguese outpost in West Africa on the Gulf of Guinea, to Lisbon, extended through this region of the Atlantic.[35] The Piri Reis map of 1513 appears to be the earliest surviving map to depict San Matteo, San Mateus, or St. Matthew's Island.

A group of islands, like those shown for St. Matthew's Island on the Piri Reis map, were sometimes shown at this same location on some earlier maps. These islands were the mythic Siren (or Mermaid) Islands,[36] shown in this same position, for instance, on the Paris map of c. 1489 to c. 1500[37] and the La Cosa map of 1500.[38] Unnamed islands are also shown at this location on the Jorge de Aguiar map of 1492.[39] We know that Piri Reis combined many maps in making his map, so it is possible that he used at least one map that depicted the Siren Islands (usually shown as five islands) and another map that depicted the solitary San Mateus Island, and that he combined these two depictions into that shown on his map of three islands named *Sanmetiyos* (San Mateus).

On the torn eastern edge of the map is a South Atlantic island that, from its position, may be either Ascension Island or St. Helena, both of which were first sighted by the Portuguese very early in the sixteenth century.

Near the top northern edge of the map in the Atlantic is a depiction of one of the popular medieval legends about St. Brendan, who sailed to fabulous islands with a group of Irish monks. A whale is shown with two persons[40] seated upon it with a ship nearby in the North Atlantic and this inscription:

> 14. It is said that in ancient times a priest by the name of Sanvolrandan traveled through the Seven Seas. He is said to have landed on this fish, thought it was dry land, and lit a fire on this fish. When the back of the fish began to burn, it plunged into the sea. The people reembarked in their boats and fled to the ship. This event is not reported by the Portuguese infidels. It is taken from the ancient mappaemundi.[41]

Sanvolrandan is St. Brendan, sometimes also St. Blandano or St. Brandan. The famous incident of St. Brendan and his fellow Irish monks landing on the

back of a whale is from the medieval tale of his legendary voyages. Similar tales were told in the *Thousand and One Nights*[42] and the medieval European and Arabic romances of the life of Alexander. This episode of St. Brendan and the whale was sometimes shown on mappaemundi of the fourteenth century and portolan charts of the fifteenth century, such as the chart made by Mecia de Viladestes in 1413.[43] The legend of St. Brendan did not appear on Portuguese maps, as Piri Reis states in the inscription, until the middle of the sixteenth century.[44] Medieval mappaemundi were sometimes oriented with south to the top, and this may be why the depiction of St. Brendan and the whale is "upside-down" on the Viladestes map and the Piri Reis map. It is also possible, however, that St. Brendan is "upside-down" because both maps derive from a common source in which the artisan wanted to minimize the possibility of smearing the map surface as he painted the figure by rotating the parchment.[45]

In the North Atlantic is the following inscription:

> 19. The Portuguese infidels do not go west of here. All that side belongs entirely to Spain. They have made an agreement that a line drawn two thousand miles to the western side of the Strait of Gibraltar should be taken as a boundary. The Portuguese do not cross to that side, but the Indian side and the side to the south belong to the Portuguese.

The raya, or Line of Demarcation, according to the Treaty of Tordesillas of 1494, was located at the longitude 370 leagues west of the Cape Verde Islands. It divided the non-Christian world between Spain and Portugal. All discoveries east of the line were to belong to Portugal and all to the west were to belong to Spain. The Line of Demarcation was sometimes shown on maps of the sixteenth century, e.g., the Juan de la Cosa map of 1500, the Cantino map of 1502, the Kunstmann no. 3 map of c. 1506, the Mantua planisphere of 1525, the Salviati map of c. 1526, the Ambassador's Globe of c. 1525–33, and the Lopo Homem world map of 1554.

The following inscription is in the middle of the North Atlantic:

> 22. This sea is called the Western Sea, but the Efren [Frankish, i.e., European] sailors call it the Mar de Ispanya, which means the Spanish Sea. Up to now it was known by these names, but Qulūnbū [Colonbo, i.e., Columbus], who opened up this sea and made these islands known, and also the Portuguese infidels who have opened up the region of Hint [India], have agreed together to give this sea a new name. They have given it the name of Ovosano, which means Healthy Egg. Before this, it was believed that the sea had no end or limit, that at its other extremity darkness prevailed. Now they have seen that this sea is bounded by a coast, and because it is like a lake, they called it Healthy Egg.

On the Leardo map of c. 1453, the name inscribed on the Atlantic Ocean is Mare de spagnia (Spanish Sea),[46] the same as on the Piri Reis map. On the La Cosa map, the name Mar Espana occurs.[47] This feature and others, such as the depiction of St. Brendan and the whale, confirm the statement made by Piri Reis in inscription no. 6 that mappaemundi were used in making the map. Bahr-i Isbaniye, or the Sea of Spain, is also used by Piri Reis in the *Bahriye* for the western Mediterranean.[48] In his letter to Luis de Santángel describing his discoveries in the "Indies," written toward the end of his return voyage in early 1493, Columbus names the oceanic region between the Azores and Europe "mar de Castilla," that is, the Sea of Castile (Spain).[49]

The statements about *Ovosano* seem to be Piri Reis's quaint, but misconceived, idea of the origin of the name Oceano or Oceanus from the Italian words *uovo* or *huevo* for "egg" and *sano* for "health."[50] It also may be that the name *Ovo* for an Atlantic island on early maps, discussed earlier in regards to inscription no. 20, was misunderstood by Piri Reis and somehow played a role in this misinterpreted etymology.

In the delineation of Europe, Africa, and the Atlantic islands (both real and imaginary) and the images of cities and people, the Piri Reis map is a typical portolan-style map of the late fifteenth and early sixteenth centuries. This indicates that Piri Reis undoubtedly used European portolan charts and portolan-style maps in composing his world map.

5 *South America*

The place-names along the east coast of South America on the Piri Reis map are those the Portuguese bestowed during their voyages of exploration in the early sixteenth century. These same names commonly appeared on maps derived either directly or indirectly from the Portuguese, for instance, Kunstmann no. 2 (c. 1502–4), Cantino (1502), Canerio[1] (c. 1505), Kunstmann no. 3 (c. 1502–8), Waldseemüller (1507), Pesaro (c. 1505–10), and Egerton MS 2803, fol. 9v (c. 1508–13). Most of these place-names are still used today.

The island named *Ile de tirnam delonce* is the island of Fernão (Fernamo or Fernando) de Loronha on the early maps. After the Loronha family married into the Noronha family, it became known as Ilha de Fernando de Noronha.

Table 3. Place-Names on South America and the Southern Continent

Key Letter	Transliteration from the Map	Probable Identification
Y	*Ile de tirnam delonce*	Ilha Fernando de Noronha
Z	*Santalo ka*	Cabo de Sao Roque
AA	*Kav de Santa Agostini*	Cabo S. Aostinho
BB	*San Megali*	San Miguel
CC	*San Francesko*	Rio São Francisco
DD	*Port dali*	Porto Real
EE	*Totel Sante*	Bahia de Todos os Santos
FF	*Abraklok*	Abrolhos
GG	*Kav Friyo*	Cabo Frio
HH	*Sano Saneyro*	Rio de Janeiro
II	*Katino*	Cananea
JJ	*Izle Matos*	?
KK	*Ilde Desane*	?
LL	*Ilde Viyole*	Viola
MM	*Il de Sara*	Serra

Santalo ka, the spelling for Santa Roque, i.e., modern Sao Roque, may be connected to "sanlique," the name for Santa Roque on the Egerton MS 2803, fol. 9r map of c. 1508–13.[2] As will be seen later, the Piri Reis map shares a significant place-name with the Egerton MS 2803, fol. 8r map and may indicate that these two maps shared at least one common source.

Abraklok is Piri Reis's rendition of Abrolhos, Portuguese for "Open the eyes," meaning "Look out!" (a warning of rocks or shoals) and the name of one of the extensive shoals on the east coast of Brazil at 18° S.[3]

Sano Saneyro (or *Sanu Saniyru*) may be Rio de Janeiro, and its appearance on the Piri Reis map would be the earliest occurrence of that famous place-name on any surviving map.[4] Its next appearance, as Rio paniero, is on the Spanish-made Turin map of c. 1523. *Sano* suggests the Portuguese *seno* (sinus or bay).[5] The name Rio de Janeiro (or might it have first been named Seno de Rio de Janeiro, i.e., Bay of the River of January, or Seno de Janeiro, i.e., Bay of January, by the Portuguese?) was given to the beautiful bay in the early sixteenth century, presumably by Amerigo Vespucci (1451–1512), who served under the Portuguese at this time.

Katino—or *Cataniu,*[6] or *katanio,*[7] or *Qatinu*[8]—may be Cananea, the south-

ernmost point reached by Vespucci,[9] later known as Cananor and Cananéia, on the coast of Brazil at about 25° S.[10]

The delineation of South America and the names upon it are typical for a map of its type and time, that is, a manuscript map of the early sixteenth century based on Portuguese source maps. The two methods for making maps at the time were drawing by hand (manuscript) and printing (woodcut and copper-plate engraving). A survey of the extant manuscript maps based on Portuguese sources of the first quarter of the sixteenth century confirms that the sources of Piri Reis's delineation of South America were Portuguese manuscript maps or maps derived from the Portuguese, possibly through the Italians, corroborating the information he wrote on the map in inscription no. 6.

Only a few manuscript maps from the Portuguese or derived from the Portuguese depicting South America have survived from before 1513. Those that are certainly Portuguese are the Cantino planisphere of 1502, the Kunstmann no. 3 map, and the chart of Brazil by Francisco Rodrigues of c. 1511–13. Those which are certainly based on Portuguese sources for the depiction of the Brazilian coastline include the Kunstmann no. 2 map, the Canerio, the Pesaro, the King-Hamy-Huntington, and the Egerton MS 2803, fol. 9r maps.

The relatively realistic delineation of the coastline of the northeast elbow and east coast of Brazil on the Piri Reis map indicates that the Portuguese source map for this region can be dated after 1502. The conventional manner in which this same coastline is merely sketched in outline on the Cantino map[11] is not evident on the Piri Reis map. This conventionalized coastline must have been present on the Portuguese Padrão, the official government map in Lisbon upon which all discoveries were recorded, from which the Cantino map was copied in 1502.

This conventionalized coastline is seen on the other Lusitano-Germanic maps, which were derived from the Padrão and other Portuguese maps containing New World delineations furnished at the end of the fifteenth century and the beginning of the sixteenth century by Portuguese and Spanish navigators. These cartographic delineations and nomenclature were used in mapmaking in Lorraine, Germany, and Central Europe during the sixteenth century. Typical of the Lusitano-Germanic maps are the Cantino (1502), Canerio (c. 1505), Ruysch (1507–8), and Waldseemüller (1507, 1513, and 1516) maps.[12]

Soon after the Cantino map was made in the fall of 1502, however, Portuguese cartographers were depicting the elbow and east coast of Brazil with increased accuracy, as evidenced by the Kunstmann no. 2 map, the Kunstmann no. 3 map, the King-Hamy-Huntington map, the Pesaro map, and the Francisco Rodrigues chart of Brazil, all of which were made either by the Portu-

guese or by Italians copying Portuguese source maps. With the increased Portuguese knowledge of this coast following their voyages of 1501–3, Portuguese cartographers abandoned this conventionalized depiction of this coast seen on the Cantino (Padrão) map and adopted a more realistic outline.

The delineation of Brazil's coast is well defined and reasonably accurate to a point just south of the approximate location of present-day Santos (24° S) or Cananéia (25° S). In this, the Piri Reis map is typical of other manuscript maps of the early sixteenth century, e.g., Kunstmann no. 2, Kunstmann no. 3, King-Hamy-Huntington, and the Rodrigues chart of the coast of Brazil, all of which exhibit the same or very similar delineation of this coastline, which ends a little to the south of the easily recognizable Cabo Busios, Cabo Frio, Rio de Janeiro, Ilha Grande, and Angra dos Reis, the great bay between Punta Marambaya and Punta Joatinga. In fact, the Rodrigues chart of Brazil and the Piri Reis map are virtually identical[13] in their delineation of the South American littoral from 7° S to about 25° S (see fig. 9). Piri Reis and Rodrigues probably used the same Portuguese source map for this coastline.

It is generally believed that the southern point on these early maps represents Cananea, the name given by Vespucci to the furthest southern point he sailed, about 25° S, on his voyage for the Portuguese in 1501–2. This point is 800 miles north of the Rio de Plata. This strongly suggests that the three-mouthed river in South America on the Piri Reis map that Kahle and others have identified as the Rio de Plata is not that river.[14] One of the three mouths is, in fact, north of Cabo Frio, a cape easily identified on the Piri Reis map by its distinctive shape. There is no river on the east coast of South America with this three-mouthed configuration. This probably represents a conventional depiction of a large river that one might reasonably expect to be draining a large continental landmass.

Of particular interest is a section of the coast of Brazil that bears a remarkable resemblance to the same delineation on the Kunstmann no. 2 map and the King-Hamy-Huntington map (see fig. 10). Although the close familial relationship regarding the coastal features of these three maps is obvious, there is no corresponding feature of exactly the same delineation on a modern map of the coast of Brazil. It apparently represents the double mouth of the Amazon.

Similarly, the depiction of the Paria Peninsula, the Gulf of Paria in Venezuela, and the island of Trinidad on the Piri Reis map is also like that shown on these other two maps (see fig. 10), but there are distinct differences from the actual delineation, as seen on a modern map. These closely corresponding features on the Piri Reis map, the Kunstmann no. 2 map, and the King-Hamy-

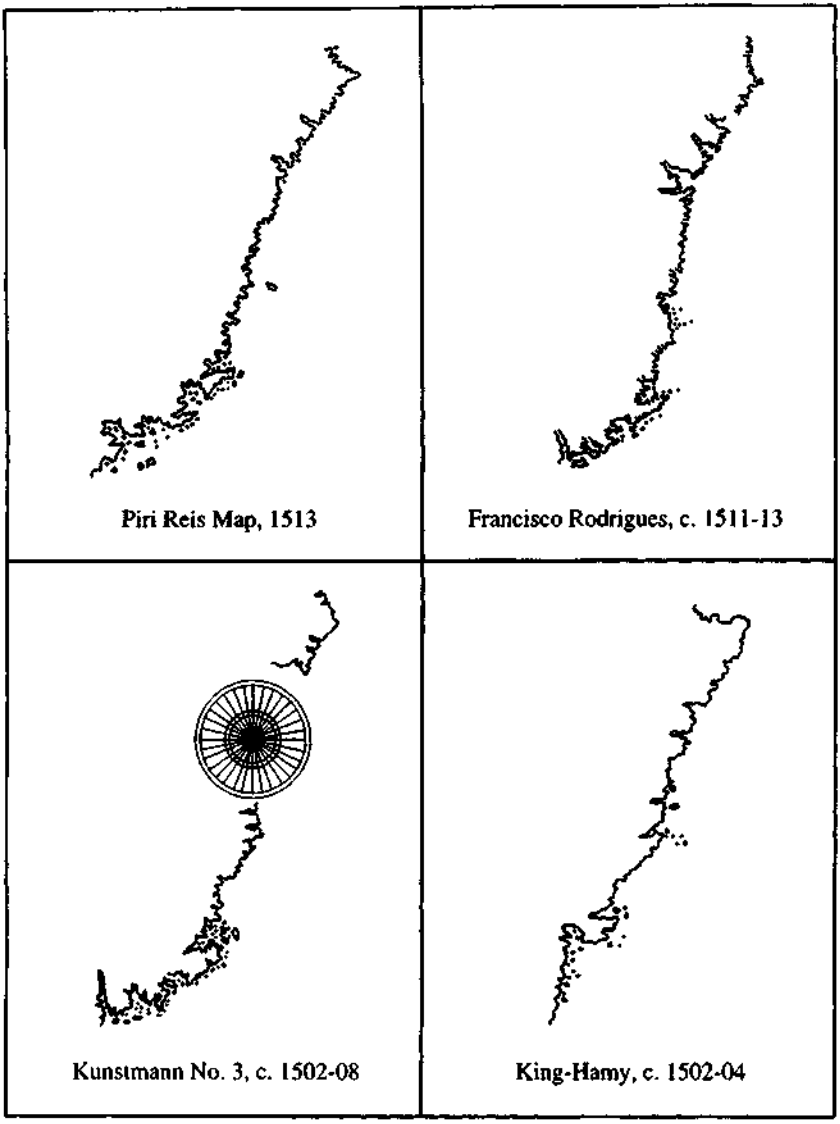


Figure 9. The east coast of South America on early sixteenth-century maps.

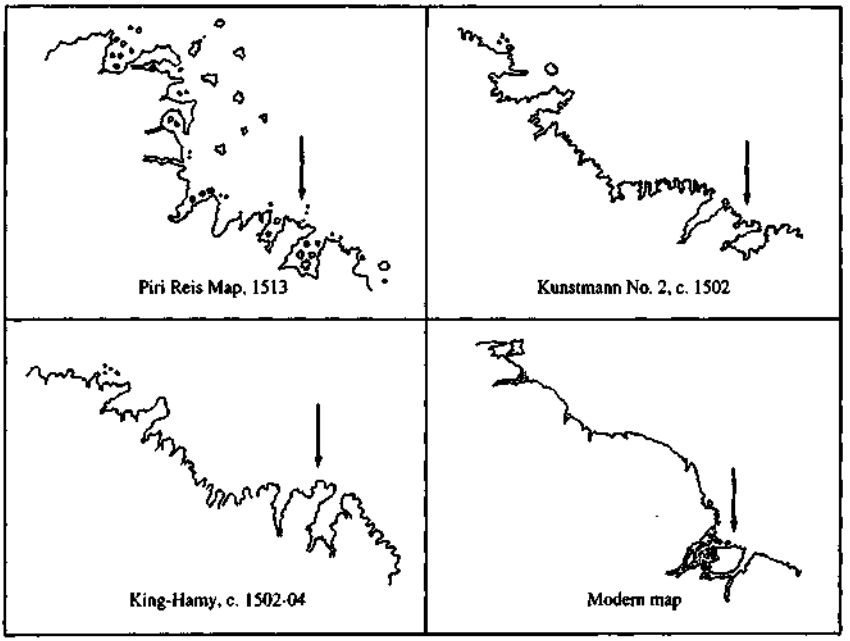


Figure 10. The northeast coast of South America on early sixteenth-century maps. The arrows indicate the similar configurations for the mouth of the Amazon River.

Huntington map further indicate Piri Reis's use of Portuguese maps or Italian copies of Portuguese maps in his compilation.

Apparently, Kahle and Hapgood, the two most influential researchers and commentators on the Piri Reis map, did not compare the coastline of South America on the Piri Reis map with other contemporary manuscript maps in order to identify features of the delineated coastline.[15] Instead, they compared the Piri Reis map only with a modern map. As in other instances, this leads to misidentifications. Superficial similarities between stretches of coastline on early maps and modern maps are notoriously unreliable for making the proper identification.

The common affinity of these delineations on the Piri Reis map, the Kunstmann no. 2 map, and the King-Hamy-Huntington map is obvious. By comparing the Piri Reis map with other contemporary manuscript maps and in conjunction with a modern map, we can more reliably identify the coastal features of this region of South America on the Piri Reis map. It will be noticed that the Paria Peninsula, the Gulf of Paria, and Trinidad, all easily identifiable when the contemporary manuscript maps are included in the comparison,

were misidentified by Kahle and Hapgood.[16] It appears the method of Kahle, Levillier, Mallery, Hapgood, and others was to ignore the place-names inscribed on the landforms on the Piri Reis map, compare its features with a modern map to "identify" the features, and then contrast the "amazing accuracy" of the manuscript Piri Reis map with early printed maps.

Hapgood and some other commentators compared the coast of Brazil on the Piri Reis map with the same on a modern map and blithely identified the rivers shown by Piri Reis in South America with the Amazon, the Essequibo, and other rivers. As part of his effort to show the remarkable accuracy of the Piri Reis map, Hapgood compared it with many of its contemporary maps reproduced in Nordenskiöld's *Facsimile-Atlas* of 1889.[17] Unfortunately, the *Facsimile-Atlas* relied on printed maps of the sixteenth century, not manuscript maps, which are usually in closer proximity to the explorers' maps and the explorations that occurred and are also of a more precise and exact delineation than those printed by woodblocks. If Hapgood had consulted reproductions of the manuscript maps of the period that depicted the South American littoral, such as the Kunstmann no. 2 map, Kunstmann no. 3 map, and the King-Hamy-Huntington map, he would have seen that the Piri Reis map is no more accurate than other manuscript maps of its time. It is, perhaps, more correct to say that the printed maps, in comparison with the manuscript maps, were more inaccurate for their time.

There are six rivers shown in South America. From north to south, Kahle identified these as the Atrato River (a river of western Colombia that empties into the Gulf of Urabá); Rio Magdalena (the largest river on the Caribbean coast of Colombia); the Orinoco; the Amazon (identifiable by the island of Marajó separating its two mouths); the Parnaíba; and the Rio de Plata, shown with three widely separated mouths. Most of these identifications are questionable. The Orinoco, as identified by Kahle, for instance, is shown far to the south of what has been shown in fig. 10 to be the Paria Peninsula and the Gulf of Paria, where it discharges. Kahle and Hapgood rather naively equated the rivers and estuaries on the Piri Reis map with some they found on modern maps without due consideration of which rivers were being depicted on maps contemporary with Piri Reis. This led to some conclusions which are probably incorrect, such as Kahle asserting that the Atrato River was shown on the Piri Reis map and Hapgood stating that the Amazon River was shown twice.[18]

Some commentators, such as Hapgood and Wolff, have identified the mountains shown in the interior of South America with the Andes, notwithstanding that they are greatly diminished in extent and misplaced on the map by several thousand miles.[19] Almost certainly these are not the Andes but a conventional depiction of mountains that medieval and Renaissance cartographers often

placed in the interiors of continents on their maps. This feature on the Piri Reis map likely came (directly or indirectly) from the Portuguese maps that were used as the source for the depiction of South America. These mountains, similarly hypothesized by Waldseemüller in 1507 on his famous world map (if not earlier by the Portuguese or Italian source of his depiction of the New World), are also shown on the Schöner Globe of 1520, which, like the Waldseemüller, also shows Lusitano-Germanic influences in its New World depictions.[20]

The evolution of the cartographic depiction of the coast of South America between the Gulf of Paria and Cabo de Saõ Roque indicates that the maps of the early sixteenth century, e.g., the Egerton MS 2803, fol. 9r map, the Canerio map, the Pesaro map, the maps of Ribero, and so forth, gave unequal and differing prominence to the various river mouths along this coast. Although the Amazon (northern mouth) was usually delineated as the largest river mouth along this coast on maps of the first three decades of the sixteenth century, the Orinoco, Essequibo, Oyapock, Pará (the southern mouth of the Amazon), and Parnaíba Rivers and the Gulf of Maranhão (Bahía de São Marcos) were often shown to be as large or even larger. And apparently there was confusion on the part of early sixteenth-century explorers and cartographers in identifying some of these rivers and estuaries. To make the proper identification of the rivers, estuaries, and bays on this coast of the Piri Reis map, a simple comparison with a modern map is inadequate. Instead, a study of how these river mouths, their shapes, and their names evolved in the manuscript maps from the earliest period would have to be made.[21] We leave this task for another time.[22]

The interior of South America shows some of the fantastic creatures often depicted on medieval mappaemundi. These beasts have a long history in ancient and medieval literature, primarily through the *Persica* and *Indica* of Ctesias of Cnidus (fl. fifth century B.C.E.), the *Historia Naturalis* of Pliny the Elder (23–79 C.E.), the *Collectanea rerum memorabilium* of Solinus (fl. third century C.E.), the *Travels* of John de Mandeville (fl. fourteenth century), the *Physiologus,* and the many bestiaries of the Middle Ages and the Renaissance.[23] Piri Reis's immediate source may have been one of the Arab bestiaries or encyclopedic works, such as the *Acaib al-Mahlukat* (*Aja'ibu-l-Makhlūqāt*), i.e., "Marvels of Creation" or "Wonders of Animate Creation," of Zakarīyā b. Muhammad b. Mahmūd al-Kammūnī al-Qazwīnī (el-Kazvini), "the Moslem Pliny," of the thirteenth century or the *Nuzhatu-l-Qulūb* of Hamdullāh al-Mustaufī al-Qazwīnī (el-Kazvini) of the fourteenth century.[24]

The *Acephali,* or *Blemmyae,* who have no heads, but instead have their faces in their chests, are shown on the Piri Reis map, along with the *Cynocephali* or

Cynophali, the dog-faced men. Also shown are the yale, a spotted horselike mythical creature with tusks and movable horns,[25] and what may be a monoceros, a legendary beast with a single curved horn, a horselike body larger than a unicorn's, and feet like an elephant's.[26] All of these fabulous creatures were previously associated with either India or Africa and, when shown on medieval maps, were depicted in either Asia or Africa.[27]

A few historians have identified some of these mythical beasts with actual South American fauna, e.g., llamas and pumas,[28] although none look like known New World animals, except perhaps the monkey depicted in the center of South America and the snake on the Southern Continent. Llamas were not known to Europeans until later during the expeditions along the west coast of South America and into the Andes.

Some commentators[29] have stated that by depicting people, birds, beasts, and monsters, Piri Reis defied an Islamic injunction against creating images of beings. A cursory examination, however, of fifteenth- and sixteenth-century Ottoman manuscripts, both maps and texts, and of other objects, such as pottery, finds many depictions of people and animals. It does not appear to be true that Piri Reis, by depicting creatures on his map, was deviating from what were normal and expected decorations for the time.

Although it is recorded that the early explorers were on the lookout for these traditional mythical creatures, the Piri Reis map is one of the few maps to depict these medieval legendary beasts in the New World. We can only guess as to how they came to be shown in South America on the Piri Reis map. Although these marvelous beasts continued to illustrate some books in the Renaissance,[30] only a few other early maps attribute these ancient fabulous beasts to the New World, such as the Sebastian Cabot map of 1544, which, according to a map legend, ascribes them to South America, and the maps of Guiana by Hondius and de Bry, both of 1599. In the prologue to the *Bahriye,* Piri Reis describes some of these same fabulous beasts and says they live on islands in the Chinese Sea.[31]

Many of the inscriptions on South America give details about the fantastic creatures that are depicted. Curiously, the inscriptions containing information about the Portuguese voyages to South America, particularly the voyage of Pedro Álvares Cabral (c. 1467–1520) in 1500, are on the part of the map where South America joins the Southern Continent. This information may have been taken by Piri Reis from the Portuguese maps he used.

The following inscription is next to the creature that somewhat resembles a mongoose:

28. They call this beast şami.

The Ottoman-Turkish word *şami* means either "illustrious" or "Semitic." The same Arabic word means "Syrian." None of these (if the reading is correct) seem to be appropriate in the context. The meaning intended by Piri Reis or the source map from which he obtained this information is not known. It may be that Piri Reis was merely giving the name of the beast without there being any significance to its meaning or etymology.

Inscription no. 25 is written on the coast of present-day Brazil:

25. This territory is inhabited and there are many people.

Inscription no. 23 is next to the image of the monoceros discussed above:

23. In this place there are oxen with one horn, and also wild beasts of this shape.

Inscription no. 24 is next to the image of the *Acephali,* or *Blemmyae,* discussed above:

24. These wild beasts attain a length of seven spans. Between their eyes there is a distance of only one span. Yet, it is said, they are harmless souls.

Inscription no. 29 is next to the image of the *Cynocephali,* or dog-faced man:

29. In the mountains of this region there are beasts in this shape, and on the shores are many men and no end of gold ore.[32]

Further south, just beyond the furthest point reached by the Portuguese during their early voyages, the Atlantic coastline of South America arcs to the east[33] to join a southern landmass. In the great bay formed by this union are several islands, some named—*Izle Matos, Ilde Desane,* and *Ilde Viyole*—and further east along the coast, *Il de Sare.*[34] The last two names occur later as Terra de Sier (perhaps from Terra de Sierras, i.e., "Land of Mountains," or Terra de Sierpes, i.e., "Land of Serpents") and Serras de Violas ("Mountains of Violas" or "Mountains of Violets") on the south side of the Strait of Magellan on the Southern Continent on the Paris Gilt Globe (also known as the De Bure Globe) of c. 1528.[35] These same two names appear on later maps, including the single cordiform world map of 1534 by Oronce Fine (Orontius Finaeus) and on a set of gores of c. 1535 made in Germany.[36] The source of the place-names *Sara* (Sier) and *Viyole* (Violas) is unknown, but the Piri Reis map preserves the earliest known instance of them, possibly from the Portuguese maps he used. Possibly *Sara* is related to or derived from the Island of Sâra, described by Edrisi in the twelfth century as being to the west of Europe and Africa in the Dark Sea and visited by the Alexander the Great of medieval legends.[37]

Several inscriptions are also written upon the Southern Continent, but they apply to South America as they describe the discovery of Brazil by the Portu-

guese under Pedro Álvares Cabral in 1500.[38] In 1515, an anonymous, very confused pamphlet, the *Copia der Newen Zeytung ausz Presillg Landt* (Copy of a Late Letter from the Land of Brazil),[39] was printed in Germany, and this led geographers and cartographers, such as Johannes Schöner in 1515 and 1520 and Oronce Fine in 1531, to mistakenly place some of their map inscriptions regarding Brazil onto the Southern Continent.[40] Later in the sixteenth century, cartographers such as Guillaume Le Testu in 1555 also depicted men and animals, including unicorns and other legendary beasts, on the Southern Continent.

It is interesting that Piri Reis, both with the inscriptions regarding Cabral and Brazil on the Southern Continent, and with his depiction of animals on the Southern Continent, apparently anticipated and presaged these other cartographers. Perhaps the information that both Piri Reis and the author of the *Copia der Newen Zeytung ausz Presillg Landt* used, which confused Brazil with the Southern Continent, came from the same source. The Piri Reis map is the earliest to transplant information regarding Brazil onto the Southern Continent and the first to depict animals, fabulous or otherwise, on the Southern Continent.

Next to the islands in the bay at the juncture of South America and the Southern Continent is the following inscription:

> 30. On these islands there is gold ore.

On the curving coastline connecting South America with the Southern Continent is an inscription that describes the Portuguese discovery of Brazil by Pedro Álvares Cabral in 1500:

> 8. On the way to the province of Hint [India] a Portuguese ship encountered a contrary wind from the shore. The wind drove it from the coast [illegible]. After being driven by a storm in a southern direction they saw a shore facing them. They advanced toward it [illegible]. They saw that there were good anchorages. They dropped anchor and went ashore in boats. They saw people walking about, all of them naked. But they shot arrows with tips made of fish-bone. They stayed there eight days. They traded with these people by signs. That bark saw these lands and wrote about them which [illegible]. The said bark, without going to Hinde, returned to Portugal and gave the news. They sent eight caravels. They described these coasts in detail and from these it is copied.

This inscription is further south than the area of Brazil that was visited by Cabral. The Cantino map of 1502 and the Contarini-Rosselli map of 1506 (the earliest known printed map depicting the New World) both have inscriptions about the discovery of South America by Cabral, and both inscriptions are also located next to a coastline that similarly curves to the east. The Cantino map is

a copy of the official Portuguese Padrão. The Contarini-Rosselli map shows some similarities with early Portuguese maps, and it seems the sources for the inscriptions on both the Piri Reis map and the Contarini-Rosselli map were similar Portuguese maps. None of the surviving manuscript or printed maps from this era, however, have inscriptions that give the amount of detailed information regarding Cabral's voyage to Brazil that is in inscriptions 8 and 18 on the Piri Reis map.

Cabral's fleet sailed south-southwest from the Cape Verde islands, presumably in order to take advantage of the northeast and southeast trade winds and avoid the doldrums of the equatorial region, as would have been learned from Vasco da Gama. After sighting the coast of Brazil (22 April 1500) and anchoring there for one day (23 April), the fleet found better anchorage at a river mouth and stayed eight days. Cabral sent one of his ships back to Portugal with the news of the discovery while the remainder of his fleet continued on to India. A fleet (which Piri Reis says in his inscription contained eight ships) was sent out from Portugal to follow up on Cabral's discovery. This inscription on the Piri Reis map is very accurate in these details and was presumably copied from a Portuguese map.

This inscription and inscription no. 18 on the Piri Reis map are the only nearly contemporary accounts to attribute the discovery of Brazil by Cabral to a storm. Although the reason for the route taken by Cabral and his fleet, which led to the discovery of Brazil, is not given in any of the contemporary accounts of the voyage, it is generally believed that the course taken was to avoid the Guinea calms, take advantage of the more favorable winds, and ensure the safety of the fleet.[41] Although modern scholarship does not attribute the discovery of Brazil by Cabral to a storm or adverse weather conditions, the evidence of the Piri Reis map may require a reevaluation.[42]

The following inscription accompanies an illustration of a ship at anchor and refers to inscription no. 8:

> 18. This is the bark from Portugal which encountered a storm and came to this land. The details are written in the margin of this map.

Inscription no. 7 is on the land connection between South America and the Southern Continent:

> 7. In this place:
>
> It is related by the Portuguese infidel that in this place night and day are, at their shortest period, of two hours duration, and at their longest phase, of twenty-two hours. The day is very warm and in the night there is much dew.

The maximum number of hours of daylight on the summer solstice and the minimum number of daylight hours on the winter solstice were the method used by Ptolemy to indicate the latitude. The latitude indicated by the number of daylight hours given in the inscription would be between 60° and 67° S, depending on whether the edge, center, or entire disk of the sun were being sighted.[43] This range of latitudes, in Drake Passage south of Tierra del Fuego and the Palmer Peninsula in Antarctica, is further south than the Portuguese or anyone else is known to have sailed until the next century.

6 *The Southern Continent*

Three inscriptions, 9, 10, and 26, inscribed upon or next to the Southern Continent, and the images of animals on the Southern Continent may pertain to South America.

9. And in this country it seems that there are white-haired wild beasts in this shape and also six-horned oxen. The Portuguese infidels have written it on their maps.

This inscription is next to the image of a quadruped with six horns. Here again Piri Reis makes an explicit reference to the Portuguese maps from which he obtained much of his information regarding the delineations, toponyms, and inscriptions he depicts in Africa, the Southern Continent, and South America.

10. This country is barren. Everything is desolate and in ruins and it is said that large serpents are found here. For this reason the Portuguese infidels did not land on these shores and these shores are also said to be very hot.

This inscription is next to the image of a snake. Several maps of the sixteenth century, such as those by Gastaldi in c. 1561 and Mercator in 1569, have an inscription, similar to this one, on that part of the Southern Continent to the south of the Atlantic Ocean, which states that the land was seen by the Portuguese but that they did not stop. It has been plausibly suggested that this later inscription, although located on the Southern Continent, refers to the discovery of the islands of Tristan da Cunha by the Portuguese in 1506.[1] The additional information about snakes Piri Reis gives must refer to Brazil. Presumably, Piri Reis would have copied this inscription from one of the Portuguese maps he used.

As will be discussed below, the Southern Continent on the Piri Reis map is often supposed to be a depiction of prehistoric Antarctica. Inscriptions 9 and 10, located on the supposed "Antarctica," give details, such as the land being hot, in ruins, with large serpents, and sighted by the Portuguese, which definitely do not apply to Antarctica and should cause anyone to question whether it is, indeed, Antarctica that is depicted.

The following inscription, as with the others in this region, may refer to Tristan da Cunha, which was uninhabited when discovered by the Portuguese. The spices may refer to Brazil:

26. These islands are not inhabited, but spices are plentiful.

The references to the land being barren and desolate and to the Portuguese not stopping there sound very similar to the statements made in the *Soderini Letter* of 1504 and in the *Suma de geographia* of 1519 describing a Portuguese voyage to the South Atlantic. The voyage they describe may have sighted Tristan da Cunha,[2] which some geographers apparently believed was part of the Southern Continent.

The presence of a land to the south, often connecting all major landmasses, had a long tradition in geographical thought, originating with the ancient Greeks, many of whom believed such a land must exist in order to balance the *oikoumene,* or inhabited landmass of the northern hemisphere. The Greeks also believed that land surrounded water rather than water surrounded land. Some cosmographers of the early sixteenth century held that the ocean was surrounded by land.[3] This theory, in which Africa and Asia were connected to the Southern Continent—Terra Australis—held that the Indian Ocean was a

landlocked sea. This theory originated with Hipparchus in the second century B.C.E. and was later promulgated by Ptolemy as a land bridge between Africa and Asia.

The Ptolemaic geographical theory of the distribution of the lands and seas formed the major geographical conception of Europeans in the fifteenth and early sixteenth centuries. The maps of Ptolemy, widely printed after 1477, show a Terra Incognita south of 15° S, connecting Africa and Asia. Even after the sea route from Europe around the south of Africa to India and the Far East was found and the absence of land connections from southern Africa to southern Asia was determined, Ptolemy's authority among Renaissance cosmographers and geographers continued, and this great southern landmass was a common feature of sixteenth-century world maps. Even the great Mercator, according to his contemporary biographer, believed in this continent, which he "realised was unknown and still awaiting discovery, but whose existence he thought he could prove by solid reasoning and argument. It could not be less in its geometric proportions, size, weight, and gravity than the other two [the Old World and the New World], otherwise the world would be unable to remain on its axis. Writers call this the Southern Continent."[4]

When the authoritative views of Ptolemy were combined by geographers with the newly discovered open sea to the south of Africa[5] and the newly discovered continent to the west of Europe, a belief in a land connection between South America and the Southern Continent seems to have arisen. The connection of South America to Terra Australis shown on the Piri Reis map is also shown on the Portuguese Lopo Homem map of c. 1519–21 (see fig. 11) and the Spanish Juan Vespucci map of 1524.[6] A slightly similar arc to the southeast coast of South America is seen on the Cantino map of 1502,[7] the Contarini-Rosselli map of 1506,[8] and the Lenox Globe of c. 1510. The Lopo Homem map depicts the land from South America connecting to Southeast Asia via the Southern Continent. This same Ptolemaic geographical conception of a land connection between Southeast Asia and the Southern Continent appears also to be present or at least implied on a map of the Moluccas in the Lopo Homem–Reinel Atlas ("Miller Atlas") of c. 1519–21.[9]

Apparently, Piri Reis's source for the depiction of the land connection between the Southern Continent and South America (and, by extension, all of the depiction of the Southern Continent and South America) was a Portuguese map. Inscriptions 7, 8, 9, and 10 at this point on the map indicate that the information in the inscriptions, which refer to Cabral's accidental discovery of Brazil and other information about Portuguese knowledge of Brazil, was copied by Piri Reis from Portuguese maps. From the time of Columbus's first voyage, the Portuguese argued that the lands to the west were new and not

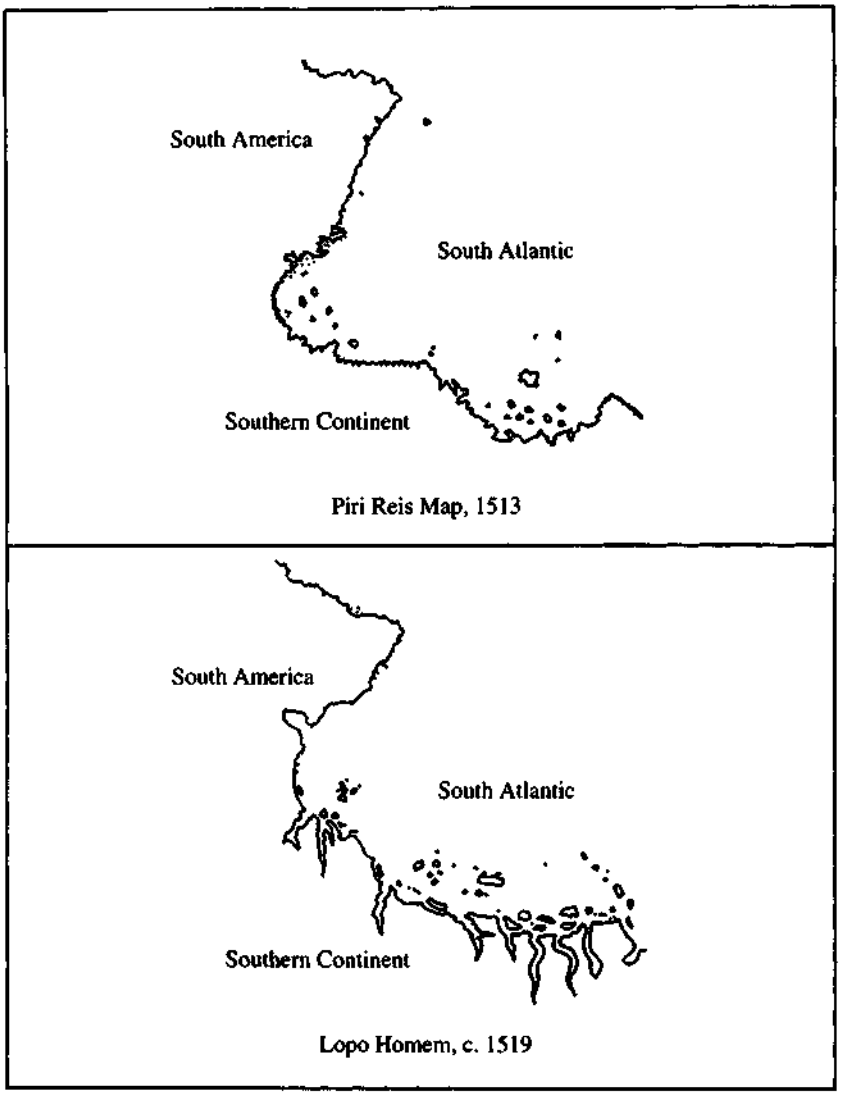


Figure 11. The Southern Continent on the Piri Reis map and the Lopo Homem map.

Asia. It was politically and commercially to the advantage of the Portuguese to maintain that the geography in this region blocked the Spanish from sailing to the Orient. This region and all lands to the west of the Line of Demarcation belonged to Spain, except for the eastern bulge of Brazil. All lands to the east of the Line belonged to Portugal. Hence, the only all-sea route to India and the wealth of the Orient, via the Cape of Good Hope, belonged to Portugal. It seems very probable, then, that both Piri Reis and Lopo Homem used the same or very similar Portuguese cartographic sources for their depiction of Terra Australis and the land connection to South America. Juan Vespucci's map, although made in Spain, may have relied on the same Portuguese sources. Juan Vespucci's uncle, Amerigo, who was employed by both the Portuguese and the Spanish, undoubtedly brought Portuguese maps with him when he moved from Portugal to Spain.

Other major landmasses were sometimes joined by sixteenth-century cartographers, such as the connection of Europe and North America via Greenland on a series of maps, predominately Italian, exemplified by the Gastaldi world map of 1548 and the Ruscelli world map of 1561. Asia and North America were also frequently joined, beginning with the Monachus map of c. 1526–30, the Oronce Fine maps of the world of 1531 and 1534, the Gastaldi maps of 1546 and 1548, and the Forlani map of 1565. The Spanish cartographer Alonso de Santa Cruz and the Portuguese cartographer Duarte Pacheco Pereira, among others, also held these views.[10]

Two widely made claims regarding the Piri Reis map of 1513 are that it depicts an astonishingly accurate longitudinal distance between South America and Africa, and that the continental landmass depicted in the south is the present continent of Antarctica as it would appear without its mantle of glacial ice. These two claims have led to the belief by many that the depictions on the Piri Reis map were copied from ancient maps that used sophisticated mathematics and were originally drawn either by a highly advanced but lost civilization or by visitors from other worlds traveling in interstellar vehicles. It has been said that the "only effective way to eradicate an error in history is to show convincingly what gave rise to it."[11] With this intent, we will now look at how these ideas evolved.

In 1936, Ayşe Afetinan (Afet Inan or A. Afetinan), while studying at the University of Geneva, did some research comparing the map of Piri Reis with other maps of the early sixteenth century. She presented her conclusions on 8 January 1937 to the Geneva Geographical Society and in her three books on Piri Reis.[12] She compared the Piri Reis map with other contemporary maps, such as the La Cosa map,[13] the Turin map,[14] the Kunstmann no. 4 map,[15] the Sebastian Münster map of America,[16] the Lopo Homem world map,[17] and the King-

Hamy-Huntington map,[18] and with a modern map.[19] She concluded that the Piri Reis map of 1513 is more accurate in the distance between Africa and South America than these maps.[20] She also concluded that "the scales in miles are astonishingly accurate," that "compared with the other maps of the period, Piri's is the most perfect and original" and "superior from the point of view of a more advanced cartography technique," and that it was "composed with a most advanced scientific spirit and method."[21] These statements are prima facie exaggerations and tell us more about pan-Turkish Kemalism of the 1930s than they do about the Piri Reis map.[22]

In 1956, Arlington H. Mallery also concluded that in relation to each other, Africa and South America on the Piri Reis map of 1513 were "positioned correctly" with "longitudinal accuracy." He concluded that the depiction of the coastline of the Southern Continent on the Piri Reis map was that of the Palmer Peninsula and Queen Maud Land of Antarctica before it was completely covered with ice. He determined this by adding a "portolano grid" (Mallery does not explain what this projection is, he apparently being the only one to know) and comparing it with the Swithinbank map of Western Queen Maud Land designed in 1953 (fig. 12).[23]

In 1956, Mallery participated in a radio program, "New and Old Discoveries in Antarctica," broadcast by Georgetown University. Other participants who supported Mallery's interpretation of the Piri Reis map were the Rev. Daniel Linehan, director of Weston Observatory of Boston College, and M. I. Walters, formerly with the U.S. Hydrographic Office.

Mallery devised an illustration to accompany the transcript of the radio broadcast (fig. 13).[24] It depicts a portion of the coastline of the Southern Continent on the Piri Reis map overlaid onto the Swithinbank map. According to Mallery and the other participants in the radio broadcast, the comparison presented by the overlay of these two maps shows an "astonishing agreement" and that the Piri Reis map is "extremely correct."

In Mallery's overlay illustration, however, the Piri Reis map does not show the "astonishing accuracy" that Mallery claimed. Without comment or notation, Mallery distorted the coasts of the Piri Reis map when he superimposed it on the Swithinbank map. This is revealed by a comparison with the undistorted representation of the same coast included by Mallery as an inset at the bottom of the illustration. This silent emendation is pointless, however, because it neither supports nor detracts from his claim for an "astonishing accuracy" for the Piri Reis map. The lack of comparison between the Swithinbank map and the Piri Reis map, as demonstrated by Mallery's illustration, is so great and so plainly evident that the minor distortions Mallery made were unnecessary. The Mallery illustration could equally be used to demonstrate the

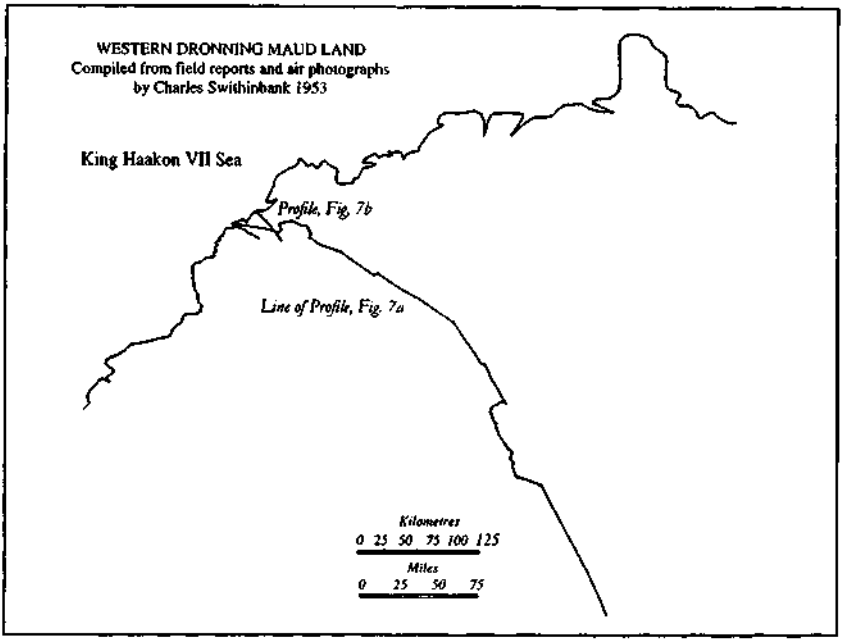


Figure 12. The Swithinbank map of western Queen Maud Land. Adapted from Holtzscherer and Robin (1954), fig. 8 on fold-out map facing p. 263. (Redrawn by permission of the Royal Geographical Society.)

lack of any comparison between the southern coast of the Piri Reis map and the Antarctic coast of the Swithinbank map.

In his illustration comparing the Swithinbank map with the Piri Reis map, Mallery added a mile scale. This mile scale, fifty miles in length, is apparently meant to support Mallery's contentions about the comparison between the Swithinbank map and the Piri Reis map, but instead it indicates some of the problems with his analysis. Applying this mile scale to other portions of the Piri Reis map reveals that the distance, for instance, from Cape Finisterre to Cape St. Vincent in Portugal is only fifty miles. It is actually four hundred miles. Similar obvious errors with this scale are present on other distances on Mallery's illustration. Either Mallery was unaware of this problem with the scale or he chose to ignore the discrepancies. The presence of the mile scale on Mallery's map certainly tends to make the map appear to be as reliable and authoritative as other maps, but I do not know why Mallery included the scale and what he was trying to prove with it.

Included with the Swithinbank map, as originally published in 1954, was a

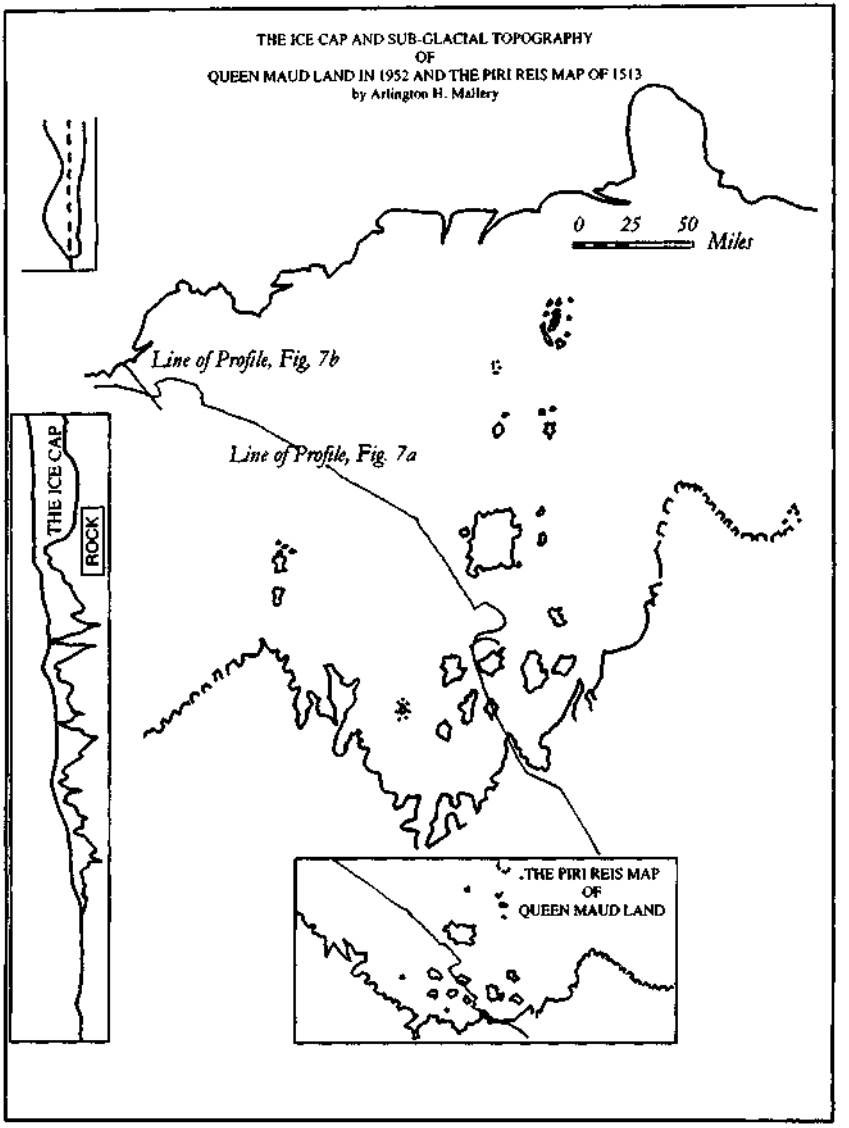


Figure 13. The Piri Reis map and the Swithinbank map as superimposed by Arlington H. Mallery. (Adapted from Arlington H. Mallery, *New and Old Discoveries in Antarctica,* radio broadcast by the Georgetown University Forum of the Air, Washington, D.C., 26 August 1956, p. E, following p. 4. Redrawn with some details omitted for clarity.)

seismic line of a portion of Queen Maud Land. This seismic line, or line of profile, was included in Mallery's illustration. This line of profile shows a cross-section of Queen Maud Land, which Mallery, supported by Linehan, claimed demonstrated that the Piri Reis map was "extremely correct." Needless to say, this seismic line of profile does not show any relation whatsoever to the Piri Reis map, regardless of the fact that Mallery overlaid the path of the line on the Piri Reis map in the bottom inset. This cross-section of Queen Maud Land, shown on Mallery's version of the Swithinbank map, shows the topography for the line of profile—mountains, valleys, peaks, depressions, etc. None of these topographical features are present on the Piri Reis map, which does not show mountains, valleys, etc., on the Southern Continent.

Figure 12 reproduces the Antarctic coastline from the Swithinbank map used by Mallery. Figure 14 shows the coast of the Southern Continent on the Piri Reis map. The position of the southern coastline from the Piri Reis map, which has a different projection than the Swithinbank map, is based on the approximate latitudinal distance of this coastline to the tropic of Capricorn and the equator on the Piri Reis map. In converting a portolan chart based on dead reckoning data, such as the Piri Reis map, to a mathematical projection, such as that used in fig. 14, the latitudes and longitudes derived can only be approximate. By comparing the Swithinbank coast of Antarctica in fig. 12 with the Piri Reis coast of the Southern Continent in fig. 14, one may note that the claim by Mallery that the two "corresponded strikingly" is not evident nor is the supposed similarity between these two coastlines present. Charles H. Hapgood, in his work on the Piri Reis map, used the Swithinbank map for the same purpose as Mallery.[25]

Mallery concluded, based on the supposedly striking correspondence, that the source map used by Piri Reis was made at least 6,000 years ago by "an unknown civilization far more advanced in scientific and technological capability than any civilization prior to his time recorded in history."[26] He also believed that the continental landmass and islands in the northwest corner of the Piri Reis map (which will later be shown to be Columbus's ideas about the Greater Antilles and Central America) were depictions of North America, Greenland, and Iceland.[27]

Curiously, although Mallery recognized that Piri Reis compiled his map from many sources, he concluded that the entire depiction of the Americas and the Southern Continent was from a single source map made by this unknown civilization. Mallery even suggests that this prehistoric advanced "civilization with experts in shipbuilding, seamanship, exploration, surveying, hydrography, astronomy, higher mathematics, detailed knowledge of the outside

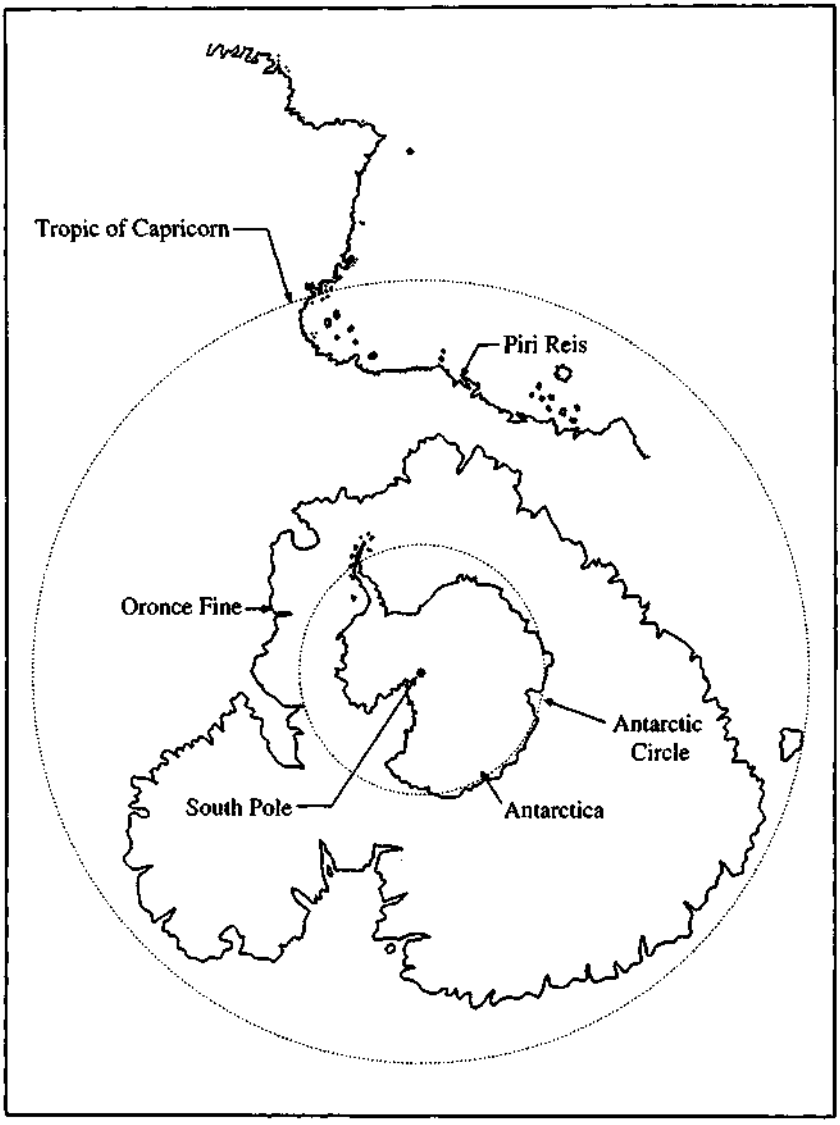


Figure 14. Antarctica, the Southern Continent of the Piri Reis map, and Terra Australis of the Oronce Fine map.

world, and certainly well-organized government" may have used airplanes to produce the map of the western and southern continents he says is preserved in the Piri Reis map.[28] He believes the Piri Reis map shows that "the Greeks and Phoenicians of the time of Alexander the Great had accurate maps of major areas of America and Antarctica."[29] He also claims that Columbus had with him on his voyage this prehistoric map, which showed the coast of Antarctica before it was covered with ice.[30]

Mallery does realize, however, that support for his "conclusion lies principally in the maps,"[31] although he does not seem to hesitate in building an edifice of suppositions based solely on the maps without corroborating evidence. Supposed similarities between a coastline on an old map and an actual coastline are hardly sufficient proof that an advanced but previously unknown worldwide civilization made a global mapping and surveying expedition.

Mallery's statements of a supposed resemblance of the coastline of the Southern Continent on the Piri Reis map to that of Antarctica beneath its ice were used by Pauwels and Bergier to argue that beings from other worlds made maps, including maps of the Antarctic coastline before it became covered in ice thousands of years ago.[32] Likewise, in 1960 Donald Keyhoe restated Mallery's claims to say that the Piri Reis map contains a copy of a map made thousands of years ago by aliens in a spacecraft, that Columbus had a copy of this map on his first voyage, and that this map showed the coasts of Yucatan, Guatemala, South America to the Straits of Magellan, and a large part of Antarctica.[33]

Mallery's amazing theory led Charles H. Hapgood to further study the Piri Reis map and other medieval and Renaissance maps.[34] He agrees with Mallery that the only possible explanation for the apparent resemblance of the Southern Continent on the Piri Reis map to the coastline of Antarctica is that it was the product of a worldwide prehistoric civilization. In Hapgood's book, *Maps of the Ancient Sea-Kings,* all of the bays, promontories, rivers, and other coastal features of the Piri Reis map are identified with actual localities, although Hapgood must postulate certain distortions by the original mapmakers in order to make his identifications fit. His book had a wide influence on popular writers to be discussed below.[35]

Shortly afterwards, Erich von Däniken, using material from Pauwels and Bergier, also claimed that the Piri Reis map of 1513 depicted Antarctica without ice and, therefore, incorporated a map made by aliens from other planets who traveled to Earth in prehistoric times.[36] After von Däniken's books appeared, these theories and interpretations of the Piri Reis map, all either explicit or implied in the work of Mallery, were repeated and developed by many other writers.[37] Some of the statements of these writers are worth repeating to show

the development of these ideas and the misstatements that have been made regarding this map.

Ivan T. Sanderson, for instance, repeats Hapgood's belief that the Piri Reis map depicts the whole eastern coastline of the Americas, from the north shore of the Gulf of Mexico to Tierra del Fuego, and a portion of the coast of Antarctica.[38] It is possible that Hapgood and others, in interpreting the northwestern continental landmass as North America, were influenced by the translation of Afetinan's first book on Piri Reis published in 1954. In a section of that work, in the original Turkish, Afetinan discusses the voyages of Amerigo Vespucci (1451–1521), Vicente Yáñez Pinzón (c. 1460 to c. 1518), and Juan Díaz de Solis (c. 1470–1516) along the South American coast and the place-names along the same coast. In the first English translation of that work, also published in 1954, the Turkish is mistranslated as the *North* American coast. In the revised edition of that work, published in 1975, after Hapgood's book was published, the error is corrected to the *South* American coast.[39]

M. Yerci repeats the claim that the Piri Reis map is "the most accurate map of the world drawn in the 16th century."[40] It hardly seems necessary to point out that the Piri Reis map, as it has survived, is not a world map, so we do not know how accurate the whole of it was. As for the surviving portion, although its depictions of Europe and Africa are no more or less accurate than other maps of its time, the depiction of South America is better than most printed maps of the first twenty years of the sixteenth century, although even this delineation of South America is not amazingly accurate for its time, as the Kunstmann no. 2 map, the Kunstmann no. 3 map, the King-Hamy-Huntington map, the Francisco Rodrigues map, and other manuscript maps show. The Piri Reis map is not the most accurate map of the sixteenth century, as has been claimed, there being many, many world maps produced in the remaining eighty-seven years of that century that far surpass it in accuracy. The Ribero maps of the 1520s and 1530s, the Ortelius map of 1570, and the Wright-Molyneux map of 1599 ("the best map of the sixteenth century")[41] are only a few of the better-known examples.

Inscription no. 5 states, in part, that "the coasts and islands on this map are copied from the map of Qulūnbū," in other words, Columbus, but it is not clearly stated which coasts and islands. The statement is ambiguous enough to permit some researchers to imply that the depiction of all of the lands to the west in the New World are from Columbus's map.[42] This cannot be correct. Columbus believed he had traveled from Europe to Asia. The depiction of the western lands on the Piri Reis map is not that of Asia, particularly because South America is connected to Terra Australis. The lands shown on the Piri Reis map present a barrier to ocean travel from Europe to Asia.

Moreover, the place-names along the east coast of South America were bestowed by the Portuguese in 1501–2. As will be shown in chapter 7, Piri Reis obtained the Columbian source map in 1501, and thus the depiction of South America on the Piri Reis map postdates Columbus's map. The depiction of Central America is also later than 1501, as will be shown. These reasons and others to be presented demonstrate that not all of the depictions in the New World are from the Columbian source map.

Some of the conclusions made about the Piri Reis map by the early commentators were used as the basis of suppositions by later commentators that are not supported by the evidence of the map. The statements by Piri Reis that some of the maps he used included a Columbian map and Ptolemaic maps were combined with the statement by Afetinan that the Piri Reis map showed an accurate longitudinal relationship between the Old World and the New World to produce some of the more extravagant claims about the map. For instance, Cyrus Gordon states: "There are features of the map which must antedate Columbus's discovery of America in 1492: notably, the essentially correct east coastline of South America in its right longitudinal relationship with the Atlantic coast of the Old World." He supposes that the essentially correct delineation of the east coast of South America must come from one of the maps from the ancient library of Alexandria.[43] Gordon used this as evidence for his claim that Bronze Age navigators from Europe made voyages to America.[44] Gordon seems to have overlooked the obvious: the essentially correct delineation of the east coast of South America derives from the voyages of the Portuguese along this coast between 1500 and 1513 (especially 1500–1503), which they depicted on their maps and which was also commonly depicted on other European maps during this same period. Apparently, Gordon believed (mistakenly) that *all* of the source maps Piri Reis used in making this map were pre-Columbian, even though the inscriptions on the map and information Piri Reis gives in the *Bahriye* tell us that other post-Columbian, particularly Portuguese, maps were also used.[45]

Ivan Van Sertima expands Gordon's statements about the accurate longitudinal relationship between Africa and South America on the Piri Reis map to include latitudes and says that the map "was drawn by a people who saw South America before Columbus" and that they "knew how to plot latitude and longitude."[46] As noted earlier, what may be the only indications of latitude on the Piri Reis map are the equator and the tropics lines. Being a portolan-style map, its coastlines are laid down according to dead reckoning and magnetic north, so any assumed understanding of latitudes on the map must be suspect. Even if the longitude between Africa and South America on the Piri Reis map was "amazingly accurate," the latitudes on the map are not.

In 1970, Alan R. Gillespie proposed that the supposedly amazing accuracy of the Piri Reis map was due to the ability of Hapgood's hypothesized worldwide pre–Ice Age civilization to plot longitude by the method of lunar distances, an extremely difficult, complicated, and not very reliable procedure of measuring the angles between the moon, stars, and planets to determine longitude.[47]

Regarding the supposed longitudinal accuracy on the Piri Reis map frequently repeated by commentators since Afetinan, particularly those who assert that it is only since the implementation of Harrison's marine chronometer in the eighteenth century that longitude can be measured, it should be pointed out that even the marine chronometer does not allow one to measure longitude directly. Longitude, unlike latitude, cannot be directly measured. Prior to marine chronometers, longitude was determined by the indirect method of dead reckoning wherein one's position or longitude from a previously known position was calculated based on the speed of the vessel (often determined by the Dutchman's log),[48] the direction the vessel had traveled (usually determined with the magnetic compass), distance (usually estimated), the time that had passed (often measured by hour glasses), and sometimes estimations of the effects of leeway and currents. What the marine chronometer did was provide a more accurate and reliable instrument for measuring the passage of time. Time is one of the variables used in calculating longitudinal position. But determining longitude still remained a process of calculation and formula; it just became more exact and reliable with the use of reliable marine chronometers.

Some authors have used Hapgood's thesis regarding a worldwide advanced civilization in ancient times to support a belief in Atlantis, the allegorical island of Plato.[49] Charles Berlitz, uncritically repeating the misunderstandings of the previous authors, asserted that old maps, such as the Piri Reis map, "show the coastline of the Americas at least 15,000 years before America was discovered" and the "coastline of the Antarctic continent." He also claimed, again based on the unfounded assertions of others, that Columbus had an early copy of the Piri Reis map that "clearly showed the eastern coast of South America (as yet undiscovered) in relation to and at the correct distance from Spain and Africa." Berlitz uses these "facts" about the Piri Reis map as "evidence" for the existence of Atlantis.[50]

John G. Weihaupt, a geology professor (as Hapgood was), independently arrived at conclusions similar to Hapgood's regarding the apparent correspondences of the delineation of Terra Australis on Renaissance maps and the actual outline of Antarctica.[51] As with most researchers, however, who have presumed that the presence of a Southern Continent on a Renaissance map is a depiction of Antarctica, he seems unfamiliar with the history of the development of the

geographical theory of Terra Australis from the ancient Greeks, through the Middle Ages, to Renaissance cartography.[52]

Not all writers who have examined the relationship of Terra Australis on the Piri Reis map to the outline of Antarctica have uncritically accepted the theories of Mallery, Hapgood, Pauwels, Bergier, and von Däniken. Some, such as Clifford Wilson, Daniel Cohen, Ronald Story, William H. Stiebing Jr., and David Woodward, have attempted to present more balanced views and represent that the kinds of depictions shown on the Piri Reis map are not unusual for its time and can be explained without hypothesizing about vanished civilizations and ancient astronauts.[53]

David C. Jolly made perhaps the most succinct critique of the Mallery–Hapgood–von Däniken theory regarding the Piri Reis map and the broader claim that Renaissance maps showing a Southern Continent, such as the Fine map of 1531, are depicting Antarctica, particularly as the theory was stated by Hapgood and Weihaupt.[54] Anyone who is interested in a clear-headed review of the controversy regarding the supposed connection between Renaissance maps and preclassical mapping techniques should read Jolly's article.

For instance, Jolly examined Hapgood's comparison of the depiction of the Aegean Sea on the Ibn Ben Zara map of 1487 with a modern map.[55] The 1487 map showed many more islands in the Aegean Sea than the modern map, and Hapgood concluded that the source map for the Aegean Sea depiction resulted from a survey made when the sea level was lower, presumably tens of thousands of years ago. Subsequent review has shown, however, that the modern map used by Hapgood merely happened to omit many of the smaller islands and if he had compared the 1487 map with a more complete and accurate modern map he might not have so quickly jumped to his erroneous conclusion. Jolly remarked that the only mystery was how Hapgood happened to obtain such a bad modern map to use for his comparison test.[56] One frequently encounters sloppy scholarship like this in Hapgood's book.

Phyllis Young Forsyth, in *Atlantis: The Making of Myth,* examines the claim that the alleged shoreline of an ice-free Antarctica on the Piri Reis map supports the assertion that Atlantis was located at the South Pole in a more temperate time in the past. She astutely points out that "a sixteenth-century map vaguely outlining the shores of Antarctica proves nothing at all about Atlantis" and that "the entire accuracy of the map leaves much to be desired."[57] It is well to keep these words in mind when examining the more imaginative claims regarding the Piri Reis map.

Hapgood himself seemed to believe that the home of this advanced yet previously unknown preclassical civilization was either the mid-Atlantic island

named *Izle de Vaka* on the Piri Reis map[58] or Antarctica before it became covered with ice.[59]

One of the difficulties of the Mallery–Hapgood–von Däniken theory that the depiction of Terra Australis, or the Southern Continent, on the Piri Reis map is a depiction of Antarctica before it was covered in ice is that their suggested solution—that maps of Antarctica were made thousands of years ago by a lost civilization or by alien astronauts—is an even bigger mystery than the mystery it attempts to answer. The principle of parsimony precludes the creation of entities beyond necessity. None of these theories suggest how preclassical or prehistoric maps were supposed to have survived for so long. If they were copied and recopied, how is it that errors apparently did not occur, as so often happens with the copying of manuscripts and other maps. The museums and libraries of the world abound with manuscripts of books and maps copied from others over the centuries, and we can identify and trace the sequence of many errors. One would expect a large number of errors to occur if a map of the coastline of prehistoric Antarctica were copied many times over thousands of years. If prehistoric and highly accurate maps had survived, whether in original form or in copies, until the thirteenth century and later, as Hapgood asserted, then one would expect to see the influence of these accurate maps upon other maps made before the thirteenth century. But we look in vain. All of the features of portolan charts and Renaissance maps that Hapgood attributes to prehistoric maps are completely absent from all prior mapmaking.

Perhaps the supposed resemblance of this coastline on the Piri Reis map to that of Antarctica should be questioned. Figure 14 shows the coastline of the Southern Continent on the Piri Reis map superimposed over that section of the coastline of Antarctica believed by Mallery, Hapgood, and von Däniken to be depicted. The Piri Reis coastline has been redrawn to the same polar projection as that of Antarctica, and the tropic of Capricorn has been used to properly locate the coastline, although it must be admitted that this relies on some guesswork and interpretation because the Piri Reis map, being a portolan-style map without longitude or latitude, is not drawn to the mathematics of celestial coordinates, as modern maps are.

The researches by Mallery and Hapgood into the Piri Reis map included other maps, primarily portolan charts. This examination of old maps has subsequently been carried on by other researchers.[60] This is particularly true of sixteenth-century maps that depicted Terra Australis, such as the South Polar projection map by Oronce Fine. In fig. 14 is also shown the South Polar projection of the map of Fine of 1531, claimed by Hapgood and others to record an

actual mapping survey of Antarctica. In order to show that the outline of the Terra Australis on the Fine map "matched" the outline of the real continent of Antarctica, Hapgood had to rotate the Fine depiction 20° in longitude, drastically alter its scale (Fine's Terra Australis is nine times larger than Antarctica!), change the position of the South Pole by 1,000 miles, and omit the 900-mile-long Antarctic (or Palmer) Peninsula.[61] This is reminiscent of the historian who "proved" that Columbus was really Cleopatra; all he had to do was change Columbus's name, nationality, gender, era, etc. As can easily be seen, the coastlines from the Piri Reis map, the Fine map, and a modern map are only superficially similar, and they fall short of proving or even strongly suggesting that the Piri Reis map and the Fine map depict the actual outline of Antarctica. When one actually examines the map evidence presented by Mallery, Hapgood, and von Däniken, one can see that there is no basis for the excessively exuberant conclusions and assertions they made.

An azimuth equidistant projection map made during World War II and centered over Cairo was used by Hapgood[62] and frequently by subsequent writers[63] to compare with the Piri Reis map. The supposed similarity between the depiction of Antarctica and the Western Hemisphere on this map and on the Piri Reis map was used to demonstrate that either the advanced but lost civilization knew and used spherical trigonometry[64] or that the earth was mapped from an orbiting spaceship. The claim is made that this map and projection represent the appearance of these coasts from a point in space. It has also been claimed that a picture of the earth from a satellite shows the same distortion to the Western Hemisphere as does the azimuth equidistant projection map, thereby demonstrating the surveying of the earth revealed in the Piri Reis map.[65] This photograph from space does not, of course, show the same distortions as the azimuth equidistant projection map.

In fig. 15, this much-used map is shown along with a few other azimuth equidistant projection maps for comparison. It will be noticed that the azimuth equidistant projection map depicts not only Africa, Europe, Antarctica, and the Americas but also Asia, the North Pole, the Pacific Ocean, and every other point on the globe, including the side of the globe opposite from the point of view. Rather than a view of the earth's surface from a point in space, as a simple glance at any tabletop globe will show, it is a construction wherein the whole earth is shown, that is, the entire surface of the sphere is shown on a plane. Like all maps and projections that depict the curved surface of the three-dimensional globe on a flat, two-dimensional surface, this is a distortion. No one projection is more correct or valid than another. Each of the many types of projections has differing properties and characteristics and serves different purposes. The purpose of an azimuth equidistant projection map is to

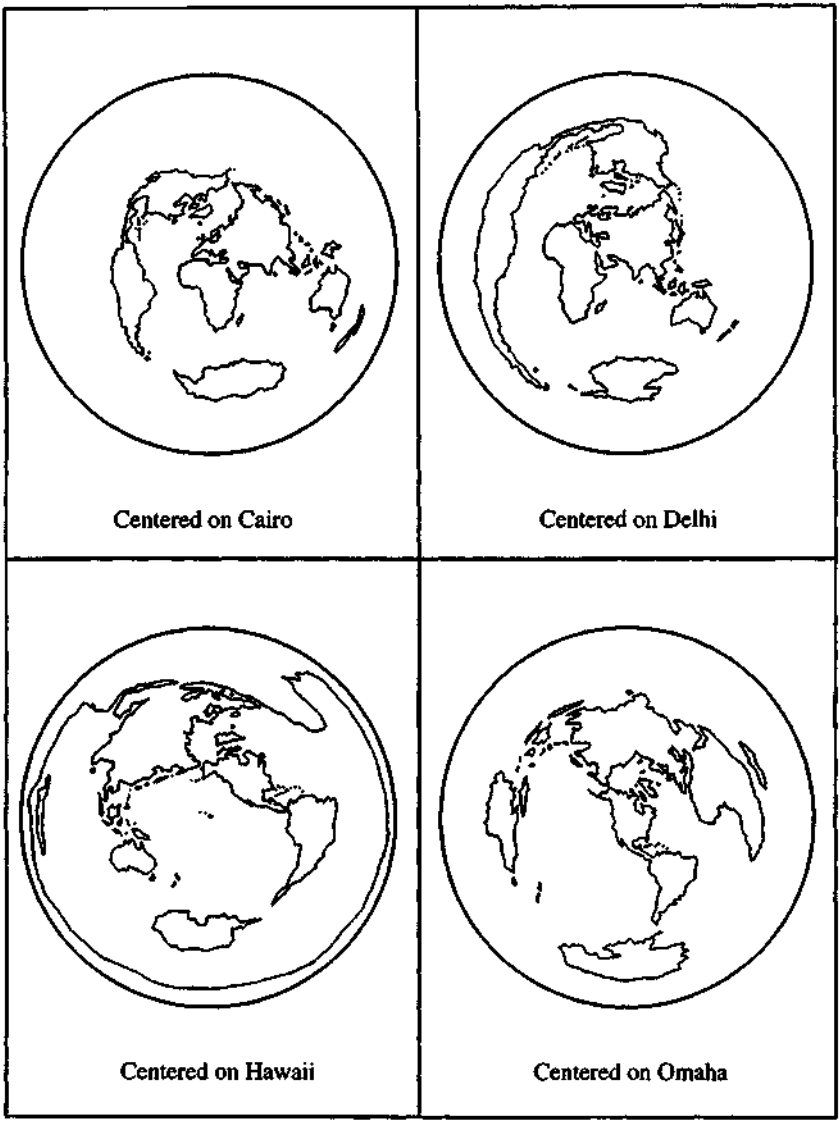


Figure 15. Examples of azimuth equidistant projection maps.

show the shortest and most direct route, a straight line, from the center point for which the particular map is made to other points on the globe. In the four maps shown in fig. 15 these center points are Cairo, Delhi, Hawaii, and Omaha. For each azimuth equidistant projection map that can be made (and theoretically there can be an infinite number because there are an infinite number of points on a globe and each can be made the center point of an azimuth equidistant projection map), all points are directionally distorted to each other but are directionally exact in relation to the center point. The outer perimeter is the antipodal point on the globe of the center point so that a point appears as a circle. The azimuth equidistant projection is more distortional, perhaps, than any other projection. It is easy to show similarities between two objects if one is permitted to topologically distort them, but this map used by Mallery, Hapgood, and von Däniken does not even show what it is purported by them to show. It is neither the result of spherical trigonometry nor a view from outer space.

As discussed earlier, the central compass rose on the Piri Reis map was probably located in northeastern Africa, as was common on portolan-style world maps of this time, such as the Cantino map. The location of this central compass rose in north Africa and the use of the azimuth equidistant projection map centered over Cairo led some writers to associate the Piri Reis map with Syene, in Egypt, one of the locales used by Eratosthenes, the ancient Greek geographer, to determine the size of the earth,[66] or with the Great Pyramids of Egypt, or with the great library at ancient Alexandria.

The identification of a coastline on a map of the fifteenth through the eighteenth centuries with an actual coastline on the basis of resemblance is fraught with peril. Hapgood even took this a step further in his theory and concluded that islands and landforms shown on medieval and Renaissance maps must have existed in actuality (i.e., euhemerism again).

This assumption, however, leads to impossible conclusions. For example, the island of Newfoundland was depicted early in the sixteenth century as a peninsula of northeast Asia, such as on the Contarini-Rosselli map of 1506, the Ruysch map of 1507–8, and the Maiolo (Maggiolo) map of 1511. Later, Newfoundland was shown as a peninsula of North America, such as on the Maggiolo map of 1527 and the Verrazzano map of 1529. Beginning with Gerhardus Mercator (1512–1594) on his map of 1538, apparently basing his depiction on information from the explorations of Jacques Cartier (1491–1557) in 1534, cartographers depicted Newfoundland as a many-islanded archipelago.[67] Eventually, of course, Newfoundland was correctly shown as a single large island. But do these differing delineations depict the geological formation and development of Newfoundland?

Similarly, California, though correctly depicted on maps as a peninsula until 1621, was thereafter usually depicted as an island until about 1760.[68] There are many other such examples in the history of cartography, particularly in sixteenth-century depictions of areas with which Europeans were less familiar, e.g., the Americas, Arctic and Antarctic regions, Further Asia, and the Pacific Basin. Yet no one has suggested that sixteenth-century cartographers were using prehistoric maps that recorded these cataclysmic geological convulsions of Newfoundland, California, and other regions.

Many examples could be given of sixteenth-century maps depicting geographical features that coincidentally are superficially similar to geological formations of thousands or millions of years ago. For example, many sixteenth-century maps show a land connection between Asia and the New World. Some maps show the New World as a mere appendage of Asia, while others, exhibiting a less contiguous relationship, show a diminished land connection, similar to that between Africa and Asia. This cartographical depiction has its source in the belief, originating with Columbus, that the new lands to the west were part of Asia. The geographical relationship between America and Asia was one of the central problems of sixteenth-century cartography and geography.

The presence of an Asian coast on the Fra Mauro map of 1459 similar to the appearance of Florida, the Gulf of Mexico, and the West Indies is an excellent example of the hazards of relying solely on apparent resemblances of coastlines without regard for the place-names or historical context of the map. Using only this portion of the coastal delineation and ignoring the toponyms, one could conclude that the Fra Mauro map shows the results of a pre-Columbian voyage to the West Indies and North America. Incidentally, this coincidence of the configurations of the West Indies with what was believed by Europeans about East Asia reinforced Columbus's belief that he had reached Asia.

Legendary, hypothetical, or rumored lands were commonly depicted on European-made maps from antiquity to the beginnings of scientific cartography in the eighteenth century. It is perhaps well to remember the warning made in 1443 by the Infante Dom Pedro of Portugal that on maps unknown regions "were not drawn except according to the pleasure of the men who made them."[69]

If one looks at the entire Piri Reis map, not just at a portion of the coast of the Southern Continent, one finds that its details conform to the geographical and cartographic ideas of the time. One cannot just focus on the supposed similarity of the coastline of the Southern Continent to the coastline of Antarctica and not look at the other delineations, depictions, and toponyms. One cannot disregard how all the features, including the Southern Continent, reflect the geographical theories of European and Islamic civilization in the late

Middle Ages and the early Renaissance. Selective use of data can be used to support almost any untenable position.

When viewed in isolation, the coastline of Terra Australis on the Piri Reis map may superficially appear to resemble the actual coast of Antarctica and lead one to conclude either that a worldwide seafaring civilization with a knowledge of higher mathematics mapped pre–Ice Age Antarctica thousands of years ago or that "ancient astronauts" hovering above the Great Pyramids in Egypt charted the globe. When compared with the other depictions of Terra Australis made before the standardization of this depiction following the maps of Mercator of 1569 and of Ortelius of 1570, it is seen that there is wide variability in the depiction. If there were maps of the Antarctic coastline, one would expect a more consistent representation. Given the varying shapes of Terra Australis on fifteenth- and sixteenth-century maps, it is easily conceivable that one of these depictions, in this case, the Piri Reis map, might bear some superficial and coincidental resemblance to the coastline of Antarctica.

Mere apparent correspondences between two jagged coastlines are not sufficient. Place-names are usually a better indicator of identity on early maps.[70] Besides, mythical animals, a common feature of partially known and unknown lands on early maps, are shown on Terra Australis on the Piri Reis map. Also, inscriptions on and adjacent to this coastline relate the story of the discovery of South America by the Portuguese in 1500. No one has yet suggested that mythical creatures actually lived in Antarctica thousands of years ago or that the Portuguese discovered Antarctica. Those who find similarities between Terra Australis and Antarctica conveniently ignore the differences and the cultural context within which the map was made, which should have ended any further discussion regarding the identity of this coastline on the Piri Reis map. As with many depictions on fifteenth and sixteenth-century maps, such as cities, peoples, animals, rivers, mountains, or geography, a coastline does not necessarily guarantee reality.

7 *The Christopher Columbus Inscription*

The longest inscription on the map, no. 5, tells the story of Columbus and the discovery of the new lands to the west. Much of the information, both correct and incorrect, in this inscription regarding Columbus is the same as was commonly told by many chroniclers of the sixteenth century. There is, however, some information that is not found elsewhere, particularly the statement that Piri Reis used a map by Columbus in making his depiction of these new western lands. As will be shown later in the analysis of the depiction of the Caribbean, a copy of a Columbian map is very likely preserved in the Piri Reis map, and this fact alone makes the Piri Reis map unique and highly significant to our understanding of the geographical conceptions of Columbus and the earliest cartography of the New World.

5. This section tells how these shores and also these islands were found.

These coasts are called the coasts of Antilia. They were discovered in the year 896 of the Arabian calendar. It is reported that a Genoese infidel named Qulūnbū [Colonbo, i.e., Columbus] discovered these places. It is said a book came into the hands of the said Qulūnbū and he found said in this book that at the end of the Western Sea there were shores and islands and minerals of every kind, and a mountain of precious stones. This man, having studied this book thoroughly, explained these matters in detail to the eminent men of Genoa and said: "Come, give me two ships, I will go and find these places." They said: "Oh, foolish man, the end and boundary of the world is to be found in the west. It is full of the mist of darkness." The above mentioned Qulūnbū seeing that no help was forthcoming from the Genoese, made inquires, and went to the king of Spain, and told his story in detail. He too answered like the Genoese. In the end, Qulūnbū talked to the king for a long time and, finally, the king of Spain gave him two ships, saw that they were well equipped, and said: "Oh, Qulūnbū, if it happens as you say, let us make you kapudan [admiral] over that land." Having said this, he sent the said Qulūnbū to the Western Sea.

The late Gazi Kemal had a Spanish prisoner. This prisoner said to Kemal Reis: "I have three times traveled with Qulūnbū to this land." He said: "First we reached the Strait of Gibraltar, then from there, taking a middle course between west and southwest in the Western Sea, we journeyed straight onwards four thousand miles until we saw an island opposite us. Gradually the waves of the sea ceased to foam, that is, the sea became calm and smooth, and the North Star—the seamen on their compasses still say Pole Star—little by little became veiled and invisible." He also said that the stars in that region are not arranged as here. They are seen in a different arrangement.

They anchored at the island which they had seen earlier opposite them. The inhabitants of that island came, shot arrows at them, and did not allow them to land and ask for information. The men and women shot arrows. The tips of these arrows were made of fishbones, and the whole population went naked and also very [illegible]. Seeing that they could not land on the island, they sailed to the other side of the island where they saw a boat. On seeing them, the boat fled and the people in the boat dashed onto the land. The Spaniards took the boat. They saw that inside of it there was human flesh. It happened that these people were of the nation which went from island to island hunting men and eating them.

The said Qulūnbū saw yet another island to which they went. They saw that on that island there were great serpents. They avoided landing on this island and went to another island and remained at anchor for seven days. The people of this island saw that no harm came to them from this ship, so they caught fish and brought them in their small canoes. The Spaniards were pleased and gave them glass beads.

It appears that Qulūnbū had read it in a book that in that region glass beads were prized. Seeing the beads, the natives brought still more fish. These Spaniards always gave them glass beads.

One day, the Spaniards saw gold around the arm of a woman. They took the gold and gave her beads. They told her: "Bring more gold, we will give you more beads." The natives went and brought them much gold. It appears that in their mountains there were gold mines.

One day, also, they saw pearls in the hands of a person. They saw that when they gave beads many more pearls were brought to them. Pearls were found on the shore of this island, in a spot one or two fathoms deep.

Loading their ship with many logwood trees and taking two natives along, they took them within that year to the king of Spain. The said Qulūnbū not knowing the language of these people, traded with them by signs. After this trip the king of Spain sent priests and barley. The Spaniards taught the natives how to sow and reap and converted them to their own religion. The natives had no religion of any sort. They walked naked and lay there like animals.

Now these regions have been opened to all and have become well known. The names which mark the places on the said islands and coasts were given by Qulūnbū that these places may be known by them. And also Qulūnbū was a great astronomer. The coasts and islands on this map are copied from the map of Qulūnbū.

In this inscription, the history of Qulūnbū, or Columbus, up to 1492 is briefly given, followed by the narrative of a Spanish prisoner. Much of this information is repeated in the *Bahriye*.[1] The events are told as though they all occurred on Columbus's first voyage. This inscription actually contains information from Columbus's first, second, and third voyages.[2] Most of the events described are not from Columbus's first voyage but from his second voyage of 1493–96 and his third voyage of 1498–1500, with some differences from what is in the records of these voyages. For instance, the men and women attacking the Spanish with fishbone-tipped arrows are mentioned in the letters of Nicolò Syllacio and Dr. Diego Alvares Chanca, both participants in the second voyage.[3] The encounters with the cannibals also occurred on the second voyage, not the first.[4] Guadeloupe is the island in the Lesser Antilles where Columbus remained for seven days (4–10 November 1493) during his second voyage. Giustiniani (or Justiniani) also mistakenly recorded in 1516 that on Columbus's first voyage cannibals in a dugout canoe were captured after a fight.[5] This refers to the fight at Santa Cruz (modern St. Croix) on the second voyage.[6] It was not uncommon that in the sixteenth century many facts of Columbus's first, second, and third voyages were combined into the report of a single voyage.

The earliest recorded observation on a voyage to the New World of the North Star becoming "veiled and invisible," that is, lost to sight near the equator, was noted by Vicente Yáñez Pinzón in 1499–1500, although the Portuguese, and presumably the Spanish, knew of this phenomenon from sailing south down the coast of Africa.[7] It may have occurred on Columbus's third voyage. He probably sailed as far south as 10° N or even 5° N. Because of atmospheric conditions and the greater diameter circle in which the North Pole rotated around the celestial pole at that time (due to precession), the star may have become "veiled and invisible," that is, below the horizon or obscured by atmospheric conditions near the horizon.[8]

The serpents Columbus saw may have been snakes, iguanas, or some larger reptiles, such as crocodiles or caimans.

The inscription also says that the Spaniards "saw pearls in the hands of a person" and that they could trade beads for pearls. This event occurred on 8 August 1498 during Columbus's third voyage.[9] Events from Columbus's first three voyages are combined in the Spanish prisoner's narrative.

Piri Reis states in this inscription that the western coasts were first discovered by Columbus in the year A.H. 896, i.e., 14 November 1490 to 3 November 1491 C.E. A discrepancy in recording the year of discovery was not uncommon at the time. The year of Columbus's discovery of the New World is variously given as from 1490 to 1497 in sixteenth-century writings.[10] Curiously, in the prologue of the *Bahriye*, Piri Reis states that the new continent to the west he calls "Antilia" was discovered in the 870th year of the Hegira, i.e., 23 August 1465 to 12 August 1466.[11] Presumably, Piri Reis made an error on the date and this does not refer to a pre-Columbian voyage.

Some fifteenth- and sixteenth-century sources, such as the Behaim Globe (1492), Bartolomé de las Casas (1484–1566), and Ferdinand Colón (1488–1539), record that a ship visited the legendary island of Antilia. The year is variously given as 1414, 1447, and before 1460.[12] After the discovery of the New World, the West Indies and South America were identified with Antilia. It is possible that Piri Reis assumed the post-1492 Antilia in America was the same as the pre-1492 Antilia in the Atlantic referred to by Behaim and the others, so he attributed a date of the supposed discovery of the island of Antilia to the continent of "Antilia."

From the inscription we learn that this Columbus map was obtained by Kemal Reis, the uncle of Piri Reis, from a Spanish prisoner of war or slave who said he had sailed three times with Columbus to the new lands across the Western Sea. In the *Bahriye*, Piri Reis describes the capture of some Spanish ships.[13] Among the booty were headdresses made of parrot wool (i.e., feathers) and a

hard black stone that could cut iron (obsidian?).[14] These same objects are described in inscription no. 3 on the Piri Reis map. The stone is undoubtedly the peculiarly hard black stone found by Columbus and his men on the island of Guadeloupe during his second voyage and used by the Caribs for hatchets.[15] Presumably, it was upon the occasion of this sea battle, probably near Valencia in 1501, that into the hands of Kemal Reis came the Spanish slave and the map of Columbus.[16] That a common sailor would possess a map by Columbus has been questioned, and it has been suggested that this Spanish prisoner was a naval officer or a pilot.[17]

The inscription states that Columbus learned of the western lands, rich with precious metals and gems, from a book. This calls to mind the 1410 *Imago Mundi* of Cardinal Pierre d'Ailly (1350–1420), the *Historia Rerum Ubique Gestarum* of Aeneas Sylvius Piccolomini (1405–64; later Pope Pius II [1458–64]), and especially Marco Polo's account of his travels, books which influenced Columbus's plan of sailing west to reach Asia.

In the *Bahriye*, Piri Reis refers to the book that influenced Columbus in terms that indicate it may have been Ptolemy's *Geographia*.[18] Piri Reis also says, however, that the book was translated into the language of the Franks (i.e., Europeans) by a man named Bortolomye (Bartolomeo). It was the Byzantine Emanuel Chrysolaras and the Florentine Jacopo Angelo da Scarperia, however, who first translated the *Geographia* from Greek into Latin in about 1406. It seems there may be some confusion on the part of Piri Reis. Soucek points out that the Arabic for Ptolemy is Batāmiyūs, and this may be what Piri Reis meant.[19]

It is possible the Bortolomye referred to by Piri Reis is Bartolomeo dalli Sonetti (usually, though probably incorrectly, identified as either Bartolomeo Zamberti or Bartolomeo Turco), who published *Liber insularum Archipelagi*, the first printed *isolario*, in Venice in 1485.[20] An isolario, or "book of islands," was a manual of detailed maps of the eastern Mediterranean developed in the fifteenth century. It was closely related to the portolans, or pilot books, and portolan charts. A distinctive feature of Bartolomeo's isolario is that each island is drawn within a compass rose of eight rays, and Piri Reis used this same feature for his maps of the Mediterranean islands in the *Bahriye*, as did Bordone in his isolario of the world in 1528. This signature feature alone shows Piri Reis's indebtedness to Italian cartography of the fifteenth century.

Another possibility is that Piri Reis was referring to Columbus's brother Bartolomé as someone capable of translating Ptolemy.

Martín Alonso Pinzón (c. 1450–93), captain of the *Pinta* and second-in-command on Columbus's first voyage, was in Rome on business before 1492

when he viewed an old document (a manuscript book or portolan chart?) that told of a mythical expedition that sailed west to Cipango (Japan), and this inspired him to propose the same expedition as did Columbus.[21] It has even been suggested that Pinzón's Rome document was a map and that Pinzón gave this map to Columbus for use in his "Enterprise of the Indies."[22]

The statement that Columbus first proposed his plan to the leaders of Genoa, his native city, confirms what several sixteenth-century chroniclers recorded.[23] Leo Bagrow, in his *History of Cartography*, quotes an unidentified Turkish source as saying that "a white Frank [i.e., European] named Colon came to Istanbul and said: 'Give me some ships and I will find a new world for you,'" but that the Turks considered the proposal ludicrous and rejected it. It would be very surprising if Columbus had offered his "Enterprise of the Indies" to an Islamic court, because two of his objectives were to promulgate Christianity in Asia and to gain enough wealth to mount a new crusade against the Turks who held Jerusalem. Bagrow's quotation is suspiciously similar to the passage in inscription no. 5 on the Piri Reis map in which Columbus offers his "Enterprise" to his hometown of Genoa but is rejected, and Bagrow's unidentified source may have garbled this.[24]

The inscription further states that the king of Spain gave two ships to Columbus. There were, of course, three ships on the first voyage, but only two returned from the voyage, the *Santa Maria* having been wrecked on reefs on the north coast of Hispaniola, and this may account for the discrepancy. Or perhaps it is because Ferdinand and Isabella ordered the town of Palos to supply two equipped caravels (*Niña* and *Pinta*) to Columbus for his first voyage.[25] This same error regarding the number of ships on Columbus's first voyage was also made by Agostino Giustiniani in 1516 and later by Sebastian Münster in the fifth book of his *Cosmographiae universalis* of 1550.[26]

In the inscription, the Spanish captive, from whom the Columbus map was apparently obtained, states that after leaving Spain, they first reached the Strait of Gibraltar. This is in conflict with the facts because all of Columbus's expeditions sailed from Atlantic ports in Spain (Palos, Cadiz, and Seville) and did not sail through the Straits from the Mediterranean to the Atlantic.

The narrative of the Spanish prisoner confuses and confounds Columbus's first, second, and third voyages into one voyage. Many of the details the prisoner relates to Kemal Reis and Piri Reis are wrong and cause one to doubt whether the Spaniard participated in all three voyages. It would appear that he had no firsthand knowledge of the first voyage. His knowledge of the second is much the same as that related by Giustiniani, even to attributing the events to the first voyage. Everything the prisoner related regarding the first voyage, which we know included muddled "facts" from both the first and second voy-

ages, was widely known during this time, and this strongly indicates the prisoner did not participate in the first two voyages. What the Spanish prisoner related to Piri Reis that we know came from the third voyage may have been obtained from personal experience. Perhaps the Turkish admirals misunderstood the Spanish prisoner to have said he had been on three voyages with Columbus when he was saying he had been on the third voyage.

8 *Puerto Rico and the Lesser Antilles*

The islands of Puerto Rico and the Lesser Antilles are easily discernible on the Piri Reis map (see fig. 16). Although correctly shown as an east-west rectangle, Puerto Rico is depicted with two peninsulas at its northwest corner. This same delineation with two peninsulas is seen on the Juan de la Cosa map. On the Cantino map (1502), the Canerio map (c. 1505), and the Waldseemüller maps (1507, 1513, and 1516), derived from the Portuguese Padrão, there is only one peninsula. The rectangle shape with two peninsulas, the earliest surviving cartographic delineation of Puerto Rico, as exemplified by the La Cosa map, degenerated into an oval shape with one peninsula on the Lusitano-Germanic maps. Derivative maps, such as the Lusitano-Germanic maps based on the Padrão, often degenerate in accuracy and

detail.[1] Puerto Rico does not actually have these long peninsulas at its northwest corner.

The Lesser Antilles are represented on the Piri Reis map as a line of islands extending southeast from Puerto Rico, similar to their actual location and orientation. Most of the islands depicted are the Leeward Islands, the northern half of the Lesser Antilles. Most of those shown are named and can be identified, even though most of the names are misplaced and applied to adjacent islands.[2]

The most southern island of the Lesser Antilles that is depicted is Dominica, the most northern of the Windward Islands and the landfall of Columbus on his second voyage. On the early Portuguese derived maps, such as the Cantino map, the Canerio map, the Ruysch map, the Waldseemüller maps of 1507 and 1513, and the Contarini-Rosselli map, only these same islands of the Lesser Antilles are depicted, as on the Piri Reis map; the Windward Islands south of Dominica are omitted on these maps. This string of islands of the Lesser Antilles and Puerto Rico are the islands Columbus discovered on his second voyage.

The name inscribed on Puerto Rico on the Piri Reis map—*Sanjuwano bastido*—is San Juan Bautista, the name Columbus bestowed upon the island when he discovered it during his second voyage. On maps of the sixteenth century it was often named San Juan (or St. John), and the name survives in the name of the capital, San Juan.

Stretching eastward from the northeast corner of Puerto Rico on the Piri Reis map is a string of small, unnamed islands that are identified from their shape, size, location, configuration, and orientation as the present-day Virgin Islands (see fig. 16). Immediately to the northeast of the unnamed Virgin Islands, however, are twelve islands which, according to the inscription next to them, are called *Undiziverjine.*

> 15. To these small islands they have given the name of Undiziverjine, that is to say, the Eleven Virgins.

Columbus discovered the Virgin Islands on his second voyage and named them Las Once Mil Virgines, i.e., Spanish for the "Eleven-Thousand Virgins" after a popular medieval legend.[3] Michele de Cuneo, an Italian gentleman who accompanied the second voyage, records the name as le XI milia vergine.[4] The place-name on the Piri Reis map, however, appears to be based on Undice Vergines, Italian for "Eleven Virgins." This may indicate that Piri Reis used an Italian map for at least part of his depiction of the Caribbean. Kahle asserted that this Italian place-name confirms that the depiction of the Lesser Antilles on the Piri Reis map is from the Columbus source map because Columbus

Table 4. Place-Names on Puerto Rico and the Lesser Antilles

Key Letter	Transliteration from the Map	Probable 16th-Century Identification	Probable Modern Identification
NN	*Undiziverjine*	Once Mil Vírgenes	Virgin Islands
OO	*Sanjuwano bastido*	San Juan Bautista	Puerto Rico
PP	*Izle bele*	Isla Bella = Gratiosa?	Vieques
QQ	*Santelmo*	?	St. Croix?
RR	*Kawaw*	Anegada or Saba?	Anegada or Saba?
SS	*Samokristo*	Santa Crux Cristi	St. Croix
SS	*Samokristi*	San Cristóbal	Saba or St. Kitts?
TT	*Sanjuwano bastido*	?	?
UU	*Santemeroye*	Santa Maria . . .	One of the "many Marys" (see text)
VV	*Galanda*	Santa Maria la Galante	Marie-Galante
WW	*Dösiyta*	Deseada	Désirade
XX	*Wadluk*	Waladhi?	Antigua?
XX	*Wadluk*	Waitukubuli?	Dominica?
ZZ	*Kalewot*	Kalucaera	Guadeloupe

was Italian.[5] Actually, there was no Italian language at the time. Columbus, although a native of Genoa, was probably illiterate in his native Ligurian language. When he did learn to read and write, in Portugal, he wrote exclusively in Castilian, the language of the upper classes.[6]

The maps of the early sixteenth century based on the Portuguese Padrão, e.g., Cantino, Canerio, Ruysch, and Waldseemüller, do not omit the *mil* (thousand) as the Piri Reis map does. The *mil* was omitted, however, from the Pesaro (or Oliveriana) map of c. 1505–10, which has the Italian form *le virgine y.*[7] The "thousand" apparently was inadvertently omitted by Piri Reis or his calligrapher, or it was missing from the map they used. Or perhaps the Piri Reis map and the Pesaro map had a common source in their depiction of the Virgin Islands that omitted the *mil.* (For another possible instance of the omission of the word *mil* on the Piri Reis map, see the discussion on *Sandani* in chapter 9.)

The duplication of the Virgin Islands, once in their correct form and location but unnamed, and again immediately to their northeast as a conventionally drawn cluster of islands,[8] provides an important clue to how Piri Reis extracted and reconciled the information from the various source maps he used, as he states in inscription no. 6. This will be discussed later in chapter 10 in conjunction with the place-name *Qal'at feridat.*

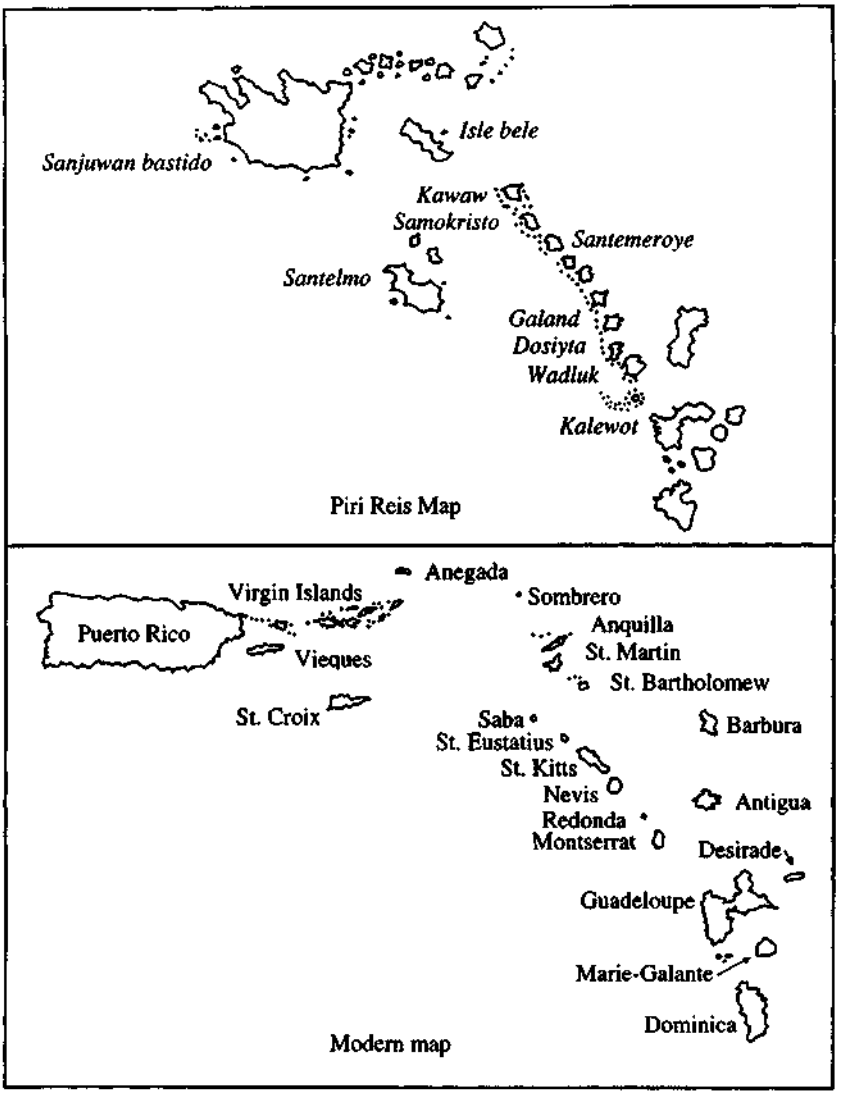


Figure 16. The Lesser Antilles on the Piri Reis map and on a modern map.

Extending to the southeast from Puerto Rico (*Sanjuwan bastido*) on the Piri Reis map are most of the islands of the Leeward Islands, the northern half of the Lesser Antilles, and a part of the Windward Islands, the southern half of the Lesser Antilles.

Immediately to the south of the unnamed Virgin Islands and to the east of Puerto Rico is an island that, because of its relative size, shape, location, and name, can be identified with the present-day Vieques. Its name, *Izle bele*, is probably from the Spanish Isla Bella, meaning "Beautiful Island." When Columbus discovered Vieques on his second voyage, he named it Gratiosa, meaning "graceful" and "beautiful."[9] Although Piri Reis often misinterprets or changes the meaning of the place-names from his source maps (as will be seen), it may be that the source map he used for the depiction of this region named this island not Gratiosa but Isla Bella, which had the same meaning.

This place-name of *Izle bele* presented problems for Roberto Almagià in 1934 in his review of Kahle's book on the Piri Reis map. Although recognizing that the name probably applied to the nearby island, as has been indicated, he instead equated the place-name *Izle bele* with the depiction of a castle on the coast of the nearby island of *Sanjuwan bastido* (Puerto Rico) rather than with the island to which it belonged. He then decided this *Izle bele* was Isabela, the Spanish settlement on Hispaniola.[10] Therefore, the island that is easily identified by name, shape, and position as Puerto Rico was identified by Almagià as Hispaniola.[11] He then confessed that he was "floundering in uncertainty" and "perplexed."[12] Unfortunately, he attributed this confusion to the map, whereas its origin lay in his confusing *Izle bele* with Isabela and confusing Puerto Rico with Hispaniola. Once he decided that the map was "confused," he expressed doubt that a source map by Columbus was used by Piri Reis, as Kahle had maintained.[13]

Directly to the south of *Izle bele* on the map is an island named *Santelmo*.[14] Judging by its relative size, shape, location, and orientation, this is probably present-day Saint Croix, although the name Santelmo is apparently unrelated to the name Santa Cruz (Saint Croix). This island, as with most of the Leeward Islands, was discovered by Columbus on his second voyage.[15]

To the southeast of *Izle bele*, in a slight arc stretching to the southeast toward South America, is a string of islands depicting most of the Leeward Islands (the northern half of the Lesser Antilles) to Dominica, the most northern island of the Windward Islands (the southern half of the Lesser Antilles). These are the islands Columbus discovered on his second voyage, and they are shown on other early maps in a similar depiction, that is, without the Windward Islands south of Dominica. The names of the Lesser Antilles on the Piri Reis map can be identified, although it is apparent that the names are mixed up and apply to

nearby islands[16] (see fig. 16). From north to south they are *Kawaw, Samokristo, Santemeroye, Galanda, Dösiyta, Wadluk,* and *Kalewot.*

Kawaw (or *Qawad* or *Gawal*)[17] is not readily identifiable. From its location in the Lesser Antilles and slight similarity of name (Kawa = Gada?), it may be Anegada, the most northeastern of the Virgin Islands, which was possibly sighted by Columbus's second voyage fleet on his return to Guadeloupe from Hispaniola at the end of his second voyage in April 1496.[18] The name is from the Spanish word *anegada,* meaning "swampy" or "waterlogged" in reference to a ship. The earliest surviving instance of the island name Anegada on a map is the Pesaro map of c. 1508. *Kawaw* may also possibly be Saba, another island name used in this region of the West Indies since the early sixteenth century.[19] An early instance of the name *sava* is on the Turin map of c. 1523.

Samokristo,[20] by its name and location on the Piri Reis map, may be the island name San Christóbal,[21] given by Columbus to the present-day Saba.[22] Later the name was transferred to the modern St. Christopher, commonly known as St. Kitts.[23] It is also possible, given the mislocation of some of the names in the Lesser Antilles on the Piri Reis map, that *Samokristo* is the modern St. Croix or Santa Cruz, originally named Santa Crux Cristi by Columbus.[24] The last part of the name was very soon dropped and the whole shortened by the Spanish. The Piri Reis map and the La Cosa map[25] would then be the only maps to preserve the last part of the original Columbian form of the name. The name on the Piri Reis map may have been mistakenly applied to one of the Leeward Islands.

Santemeroye[26] is one of the "many Marys" Columbus named in the Lesser Antilles north of the landfall of his second voyage at Dominica. Kahle supposes that *Santa Mardia* and *Galanda* referred to Santa Maria Galanda (Marie-Galante) but that the name was written in two lines on the Columbus map, and Piri Reis thought it was two names for two islands.[27] This theory is unnecessary when one notices the number of "Maria" names given by Columbus to islands in the same region. These were Santa Maria la Galante, Santa Maria de Guadalupe, Santa Maria de Monserrate, Santa Maria Redonda, Santa Maria la Antigua, and Santa Maria de la Nieve.[28]

Galanda[29] is from Santa Maria la Galante, the place-name Columbus gave to the present-day Marie-Galante, which he named after the flagship of his second voyage fleet.[30]

Dösiyta is undoubtedly the island Deseada, Spanish for "the Desired One," the modern Désirade, the first land sighted when sailing on the preferred route from Europe to the Caribbean region.[31] It also occurs on the La Cosa map (la descada, deseada, or la desseada), the Cantino map (ilha desejada), the Turin map (deseade or deseada), and other early maps.[32]

Kahle read the place-name *Dösiyta* as *Usiet* and suggested it might be Santa Lucia (St. Lucia) because Piri Reis might have misread the first letter, *L*, as *al*, the definitive article *the* in Arabic. Therefore, Piri Reis misread "Lucia" as "al-Ucia" or "al-Usiet." St. Lucia is an island almost two hundred miles further south than Désirade. Kahle admits that it does not seem very likely that *Usiet* is St. Lucia because, as he states, Columbus did not visit St. Lucia until his fourth voyage in 1502.[33] Kahle maintained in his book and many published articles on the Piri Reis map that the Columbus source map used by Piri Reis was from Columbus's third voyage in 1498. Subsequent historians, such as Reguera Sierra, Ballesteros Beretta, and Almagià, have accepted Kahle's tentative identification of this place-name as Santa Lucia and his assertion that this island and the other islands of the Lesser Antilles are from a Columbus map of 1498. They do not question the anachronism arrived at by Kahle of a Columbian place-name from 1502 on a 1498 map.[34] Santa Lucia is probably not a Columbian place-name, anyway. In truth, Columbus probably never visited St. Lucia.[35] The earliest recorded occurrence of the name is in 1512.[36] Its first known appearance was on the Turin map of c. 1523.[37]

Deseada, or Désirade, may possibly not have been discovered by Columbus. It was, however, visited and named by the Spanish before 1500, the year in which it appeared on the Juan de la Cosa map. Although some sixteenth-century Spanish historians state that Columbus discovered Deseada upon his return to the New World in November 1493, the judgment of modern scholars, based on the earliest Spanish records, has been that Columbus did not discover Deseada.[38]

Peter Martyr (1457–1526), in Decade 3 of *De Orbe Novo*, written in the 1490s, indicates that Deseada is a newly named island, implying it was discovered and named sometime after the islands discovered on Columbus's second voyage.[39] If Columbus did not bestow the name on the island at the beginning of his second voyage, he may have done so when he returned to Guadeloupe and the surrounding islands in April 1496. It is also possible that Deseada was discovered and named by Alonso Sánchez de Carvajal, who, in the spring of 1498, commanded a fleet of three ships from the Canaries to the West Indies via a route Columbus indicated.[40] Perhaps Columbus indicated on a map to Carvajal that this island was "the Desired One" or goal of the transatlantic route. It may even have been named by an unknown Spanish voyager to the New World sometime between 1493 and 1500.

Wadluk is not identifiable, although its initial sound or syllable appears to be a common prefix for Carib place-names. For instance, the Carib name for Antigua was Waladli,[41] for Barbuda was Wa'omoni,[42] for Dominica was Waitukubuli,[43] and for Nevis was Walie.[44] *Wadluk* might be any of these islands,

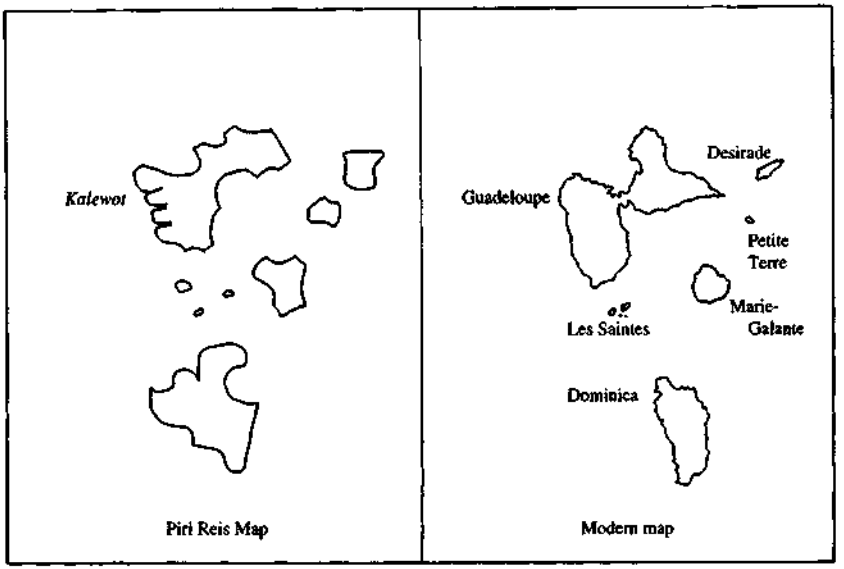


Figure 17. *Kalewot* on the Piri Reis map and Guadeloupe on a modern map. Adapted from Samuel Eliot Morison, *Admiral of the Ocean Sea* (Boston: Little, Brown, 1942), 2:71.

although the name is given to an island on the Piri Reis map that seems to be in the approximate location of present-day Nevis.[45] Kahle, in his studies of the Piri Reis map, thought that the name *Wadluk* was a poorly transcribed Santa Maria de Guadalupe, the name Columbus gave to modern Guadeloupe, and several subsequent scholars have followed Kahle in this interpretation.[46]

Immediately to the east of *Wadluk* is a larger island with a picture of a parrot perched on it that from its configuration and location may be the islands of Antigua and Barbuda. If so, this may be the earliest cartographic depiction of Antigua; it was not seen again on maps until the Kunstmann no. 4 map of c. 1519–20 and the Turin map of c. 1523.[47]

Kalewot is the name given to an island that from its shape and location is obviously Guadeloupe (see fig. 17).[48] The name may be from Kalucaera, the native Carib name for the island of Guadeloupe.[49] Kahle supposed that the name *Kalewot* was a transcriptural error by Piri Reis for Punta Galeota, the present-day name of the cape at the southeast corner of Trinidad.[50] Columbus discovered this cape on 31 July 1498. The similarity of *Kalewot* to Galeota was the primary evidence Kahle used for dating the Columbus source map as 1498. Columbus did not, however, name the cape Galeota. He named it Cabo de Galera. The modern toponym, Galeota, for a point or cape on Trinidad was

not used before the eighteenth century.[51] There are several reasons for discounting Kahle's 1498 dating, not the least of which is that there is no connection between the name *Kalewot* on the Piri Reis map of 1513 and the more modern, non-Columbian name of Galeota, as Kahle supposed.

This misidentification of *Kalewot* as Galeota is analogous to a potentially similar situation regarding Montreal and Chicago.[52] Many maps of the sixteenth century show the place-name Chilaga in the interior of North America. Chilaga and Ochelaga are alternate spellings for Hochlega, the native name for the village that became Montreal. Chilaga is similar in spelling to Chicago, which, like Montreal, is a city located in the interior of North America, but the place-name of Chicago or its early variant spellings did not occur on maps until the eighteenth century. If one were to apply the same rationale as Kahle used for identifying *Kalewot* as Trinidad, then the following might be the process: (1) Chilaga on the Ortelius map of 1570 is similar in spelling to Chicago; (2) Chilaga is, relatively speaking, located near the present city of Chicago; (3) we know this portion of the Ortelius map contains information ultimately derived from Jacques Cartier, although it is secondhand and indirect, the Ortelius map being made thirty-seven years after Cartier's voyage to Chilaga, i.e., Hochlega; (4) ergo, Chilaga is Chicago, and Chicago was discovered by Jacques Cartier, and the Ortelius map of 1570 contains a copy of Jacques Cartier's 1535 map of Chicago.

Another similar anachronistic misunderstanding of a place-name on an old map was made by Bernard Hoffman, who claimed that the Juan de la Cosa map, dated 1500, was made after 1502 because the place-name of Madagascar was on the map in the Indian Ocean and Madagascar was not discovered by the Portuguese until 1502. The reason Hoffman gives is an anachronism. Although it is true the island we presently know as Madagascar was not discovered by Europeans until 1502, as a place-name it was often shown on maps of the fifteenth century as an island in the middle of the Indian Ocean, usually coupled with an equally mislocated Zanzibar. The Europeans knew of the existence of these islands in the Indian Ocean from information brought back to Italy by Marco Polo (c. 1254–1324) at the end of the thirteenth century, but they were unaware of their correct location in the Indian Ocean and in relation to the coast of Africa. The island of Madagascar was first named by the Portuguese in 1502 after Saint Lawrence (San Lorenzo). It was not identified with the earlier place-name of Madagascar until the following decade.[53]

Many subsequent commentators, such as Afetinan, Bibicou, Goodrich, Konyali, Tekeli, and Yerci, have followed Kahle in the erroneous identification of *Kalewot* as Galeota and in the mistaken attribution of the 1498 date for the Columbus source map used by Piri Reis. Tekeli also gives *Kalera* as the place-

name on the Piri Reis map, apparently misunderstanding Kahle's anachronistic ideas regarding *Kalewot,* Galeota, and Galera.[54]

Marvel, also apparently persuaded by Kahle that *Kalewot* was Galeota, conjectures Kalevut or Kale'oot may be an aboriginal name possibly preserved in the name Punta Galeota on Trinidad, notwithstanding the fact that *galeota,* the Spanish word for a small-oared galley, is an obvious derivative of *galera,* the Spanish word for oared galley.[55] It would be perhaps too great of a coincidence that after the Spanish named the southeast cape Galera, they were to find that the natives of Trinidad had a place-name, Kale'oot, so similar in sound to *galeota,* the diminutive of *galera,* for this same cape. The date of the Columbian source map used by Piri Reis is probably about 1495–96, as will be seen, and did not include the Lesser Antilles and Trinidad as Kahle believed and others repeated.

The islands to the south between *Kalewot* (Guadeloupe) and the mainland of South America do not conform in size, shape, or position with the remaining Windward Islands and probably do not denote actual islands. Kahle presumed these represented the "islands" Columbus had seen between 1 August and 11 August 1498, which turned out to be headlands of the South American continent.[56] Even though Columbus knew by 11 August that they were not islands and had realized the continental nature of South America, Kahle supposed that Columbus continued to show them as islands on his map. After 11 August Columbus believed this large continental landmass was Java, described by Marco Polo as the largest island in the world situated to the south and southeast of Ziamba or Chiamba, i.e., Southeast Asia.[57] A publication of the Smithsonian Institution incorrectly states that the "islands" seen at this time by Columbus are named on the Piri Reis map.[58] This error was due to a misreading of Kahle;[59] the names of the "islands" (i.e., headlands) given by Columbus and referenced by Kahle were misinterpreted in the Smithsonian publication as names on the Piri Reis map.

Superficially, it appears the island of Trinidad is missing from the Piri Reis map. *Kalewot* can be dismissed as being Trinidad because it is easily identifiable as modern Guadeloupe, due to its name, distinctive shape, and relative position to the surrounding islands and the Lesser Antilles. If the Columbian source map was from Columbus's third voyage, as Kahle claimed, then one would expect to find Trinidad on the Piri Reis map. As we saw in fig. 10, however, it had become diminished and reduced to an insignificant offshore island on the Piri Reis map. This same modification occurs on the Kunstmann no. 2 map and on the Schöner Globes of 1515 and 1520. In fact, the 1520 globe shares many features of its depiction of South America with the Piri Reis map. On the King-Hamy-Huntington map, Trinidad is omitted altogether. Not surpris-

ingly, the depictions of South America on the Piri Reis map, the Kunstmann no. 2 map, the King-Hamy-Huntington map, and the Schöner Globes derive (directly or indirectly) from Portuguese sources.

These two place-names in the Lesser Antilles, *Wadluk* and *Kalewot*, are likely to be native Carib place-names. They do not occur on any other surviving maps. Carib place-names were superseded by European place-names. The occurrence of these two Carib place-names suggests that the map used by Piri Reis for this region of his map was an older map compared with the other depictions of the Lesser Antilles in use in 1513. In depicting and naming only the islands of the Lesser Antilles that are from Dominica northward, the islands discovered by Columbus on his second voyage, the Piri Reis map conforms to the typical depictions of the early sixteenth century, particularly those based on Portuguese maps, such as the Cantino map, the Canerio map, the Ruysch map, the Waldseemüller maps of 1507 and 1513, the Kunstmann no. 2 map, and the Contarini-Rosselli map. The exception to this is the Juan de la Cosa map of 1500. The La Cosa map also shows and names the Lesser Antilles to the south of Dominica (the Windward Islands) discovered by Vicente Yáñez Pinzón in the spring of 1500. The La Cosa map also shows a Puerto Rico with multiple peninsulas at its northwest corner, as does the Piri Reis map.

9 *Hispaniola and the Bahamas*

According to Piri Reis in inscription no. 6, he used a map by Columbus for part of the depiction of the western regions, or New World. An analysis of the depiction of Hispaniola, the Bahamas, and Cuba indicates that this is probably correct and that a copy of a map made by Columbus or under his supervision, possibly in 1495–96 (not 1498, as Kahle asserted), is preserved within the Piri Reis map of 1513.

On the map, the depiction of Hispaniola does not at first glance appear to resemble the true shape of Hispaniola. It can be identified, however, by the two place-names inscribed upon it, by the delineation of its southern coast, and by an understanding of what Columbus believed about Hispaniola.

One inscription, transliterated from the Arabic script into Roman letters, is

Table 5. Place-Names on Hispaniola

Key Letter	Transliteration from the Map	Probable 16th-Century Identification	Probable Modern Identification
AB	*Elcezire Izle despanya*	Isla de Española	Hispaniola
AC	*Paksin vidad*	Villa de Navidad	Navidad

Elcezire Izle despanya.[1] This is a combination of the Arabic word *elcezire* (the island), and the Spanish *isla de españia* (Island of Spain or Spanish Island). When Columbus discovered this island on the first voyage, he gave it the name La Isla Española, meaning "the Spanish Island."[2] The island name La Isla Española was shortened by Bartolomé de Las Casas to Española and Latinized by Peter Martyr[3] to Hispaniola. It would seem that Piri Reis read the name Isla Española, or Isla de Españia, on this island on the source map and attempted to give to the island copied onto his own map a name loosely meaning "The Island of Isla de Espania" and thus wrote it as Elcezire Isla de Espania, or *Elcezire Izle despanya.* The literal translation of the Arabic-Spanish hybrid *Elcezire Izle despanya* is "The Island of the Island of Spain" or "The Island Named the Spanish Island."

As will be shown, the island of Hispaniola has been turned on end 90° clockwise so that what appears to be the east coast of the island is actually the north coast of Hispaniola, the south coast is actually the east coast, and the west coast is actually the south coast.[4] To maintain consistency and indicate the correlation to reality, the respective directions and coastlines of this island will be referred to by their true direction and orientation as though the island on the Piri Reis map had been rotated 90° counterclockwise to match reality (see fig. 18). For instance, the location of the depiction of the castle or city on the island will be referred to as on the north coast of *Elcezire Izle despanya.* This castle probably denotes the settlement of Isabela.[5]

The other name inscribed on the island is *Paksin vidad.* This name is undoubtedly Navidad,[6] the name of the first settlement Columbus founded in the New World on the north coast of Hispaniola which occurs on only a few other maps, such as the Alba sketch-map of the north coast of Hispaniola (of questionable authorship, but believed by some to be drawn by Columbus in 1493), which has Nativida, and the Juan de la Cosa map of 1500, which has Navida.[7] This appears to be another instance on the Piri Reis map where a place-name has "migrated" from the feature it denoted on the source map to another nearby feature. The place-name Navidad, which should properly be located on

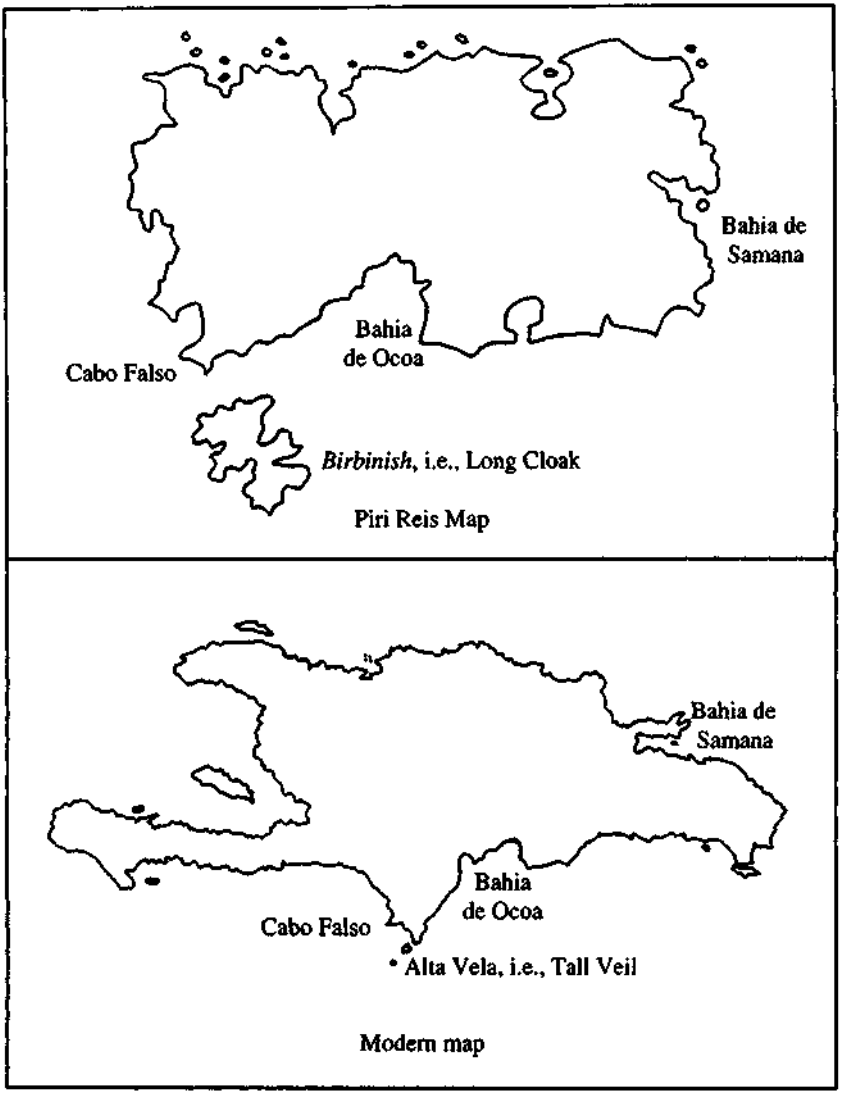


Figure 18. Hispaniola on the Piri Reis map (turned 90°) and on a modern map.

the north coast of Hispaniola, has moved to the south coast (west on the map) on the Piri Reis map and become *Paksin vidad.*[8]

Some cartographic examples will illustrate this nomadic nature of toponyms. For instance, Monte Cristi and Isabela, on the north coast of Hispaniola, were place-names given by Columbus on his first and second voyages, respectively. Notwithstanding that Hispaniola and Cuba were continuously familiar to the Spanish, and eventually other Europeans, from the early sixteenth century, these two place-names were duplicated and transplanted to the north coast of Cuba, as seen on the regional maps of the West Indies by Abraham Ortelius in 1579 and on the maps by Théodore de Bry from the 1590s.

Similarly, many of the place-names given by Giovanni da Verrazzano (c. 1485–1528) during his 1524 voyage along the east coast of what became the United States are duplicated, and even triplicated, on the map of 1529 by his brother, Girolamo da Verrazzano, such as Vendomo (twice), morello (three times), and limpo (three times). Of the sixty-four toponyms on the coast of North America north of the imaginary Verrazzanian isthmus, thirty-six are duplicates or triplicates. Location and duplication errors were easily made by cartographers and just as easily copied and recopied by subsequent cartographers.

Another example of the nomadic nature of map toponyms is the ancient city of Cattigara, described by Ptolemy as being the place furthest east and believed to have been the modern city of Hanoi,[9] Hang-chow,[10] or Malacca.[11] It is shown on the Ptolemaic world maps of the fifteenth century. By 1522, however, the city of Cattigara had "migrated" from Southeast Asia to the west coast of South America on the Zorzi maplets.[12] Cattigara is again shown on the west coast of South America on the Sebastian Münster map of the Western Hemisphere of 1540 and on the Oronce Fine world map of 1531.

Kahle proposed that *Paksin vidad* was "San Domingo," i.e., Santo Domingo, the city founded by the Spanish on the south coast of Hispaniola in August 1496.[13] Apparently, he suggested this because *pak* is Turkish for "holy" and, therefore, this would be a translation by Piri Reis of the Spanish *San* or *Santo.* This fit the chronology of Kahle's theory that the Columbus source map used by Piri Reis was from Columbus's third voyage of 1498. Santo Domingo, however, was originally named Nueva Isabela.[14] It was renamed Santo Domingo in 1502 when the city was rebuilt following a hurricane.[15] The interpretation by Kahle of *Paksin vidad* as Santo Domingo does not chronologically fit his theory that the date of the Columbus source map is 1498 and clearly indicates that this place-name is not Santo Domingo.[16] *Pakin vidad* cannot be both Santo Domingo and from a 1498 Columbus map.

Kahle also claimed to have read the toponym Semana at the eastern part of

this island.[17] Curiously, no one else has seen this name on the map. Samana is a native Taino word[18] or place-name that survives in Samana Cay in the central Bahamas and as the name of the great bay at the eastern end of Hispaniola, Bahía de Samaná. Presumably, it was the bay to which Kahle was referring.

The shape and orientation of Hispaniola on the Piri Reis map is strikingly similar to that of the island of Cipango shown on maps of the fifteenth and sixteenth centuries. Cipango was the name given by Marco Polo for the islands of Japan and was one of Columbus's destinations on his first voyage. It was believed by Columbus and his contemporaries that this island of Cipango was rectangular with its main axis oriented north-south.[19] Some early maps showing Cipango with this shape and orientation are the Yale-Martellus world map of c. 1489, in Henricus Martellus Germanus's *Insularium Illustratum* of c. 1489, the Behaim Globe of 1492, the Contarini-Rosselli world map of 1506, in the Pietro Coppo Atlas of 1520, and the Bordone *Isolario* of 1528 (see fig. 19).

One other extant map from this period appears to depict Hispaniola with the north-south orientation of Cipango. This is in the Ferrara codex.[20] This manuscript, written in the early sixteenth century, describes the newly discovered lands, people, flora, and fauna of the New World. Included in this manuscript are several maps of various regions in the West Indies and South America. One of these maps, that of Hispaniola (see fig. 20), appears to depict the island with the same north-south orientation as on the Piri Reis map and as traditionally used for Cipango. From the delineations of the other Caribbean islands shown in the Ferrara manuscript, it appears the source map or maps used by the author of this Italian work were similar to those used by the maker of the Cantino map in Lisbon in 1502.

When Columbus discovered the island of Hispaniola during the first voyage, he believed it was Cipango.[21] This belief regarding the identity of the island persisted into the sixteenth century. A note on the Ruysch map of 1507–8, for instance, states that "what the Spaniards call Spagnola is really Cipango."[22] Oronce Fine, on his cordiform world map of 1534, followed Ruysch in this identification and labeled Hispaniola as Zipango, i.e., Japan,[23] as did Caspar Vopel on his map of 1542.[24] The island of Hispaniola on the Piri Reis map is shown with the traditional north-south orientation of Cipango.

Although Columbus maintained that Hispaniola was Cipango[25] and Hispaniola on the Piri Reis map is given the traditional shape and orientation of Cipango, it can be questioned whether this depiction on the Piri Reis map is copied from a map made by Columbus. The traditional shape of Cipango is a rectangle. Columbus apparently maintained that Hispaniola (his Cipango) was a square.[26] This may indicate that the source map used by Piri Reis was not by Columbus, as he maintained in inscription no. 6, but was a Columbian map,

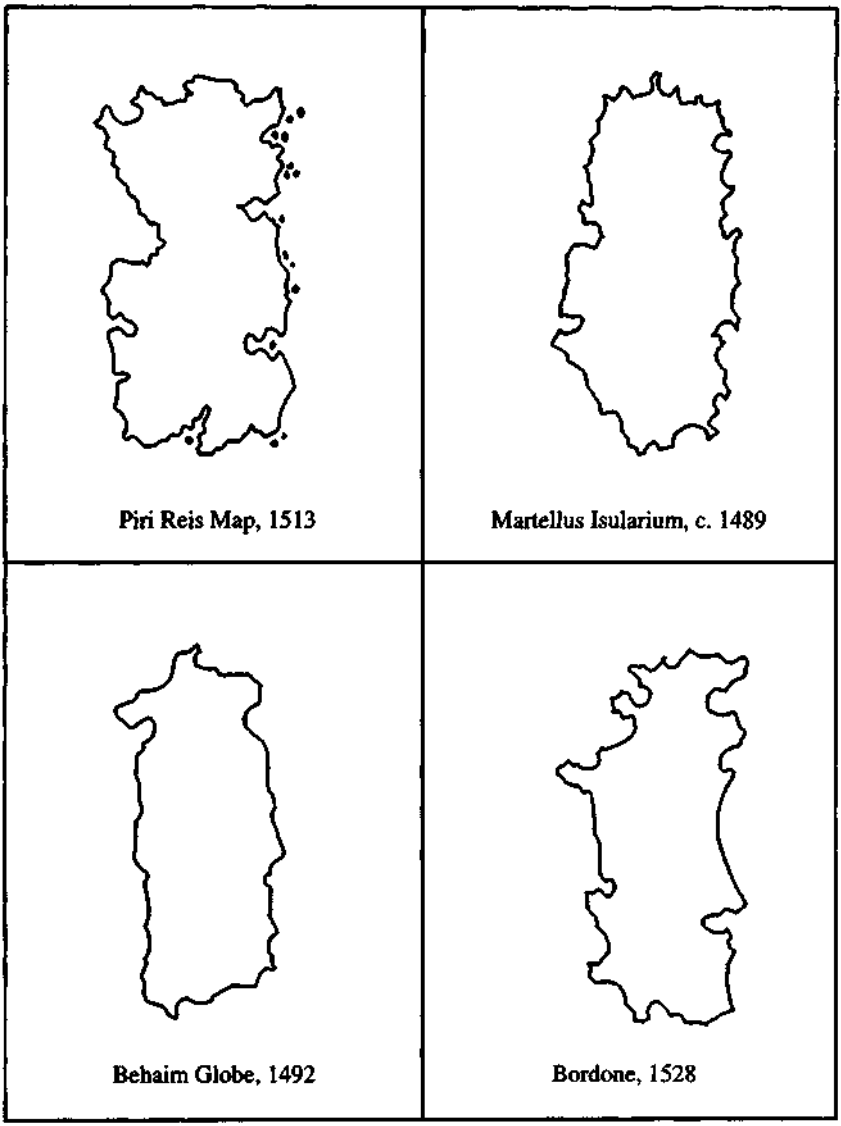


Figure 19. Cipango (Japan) on fifteenth- and sixteenth-century maps.

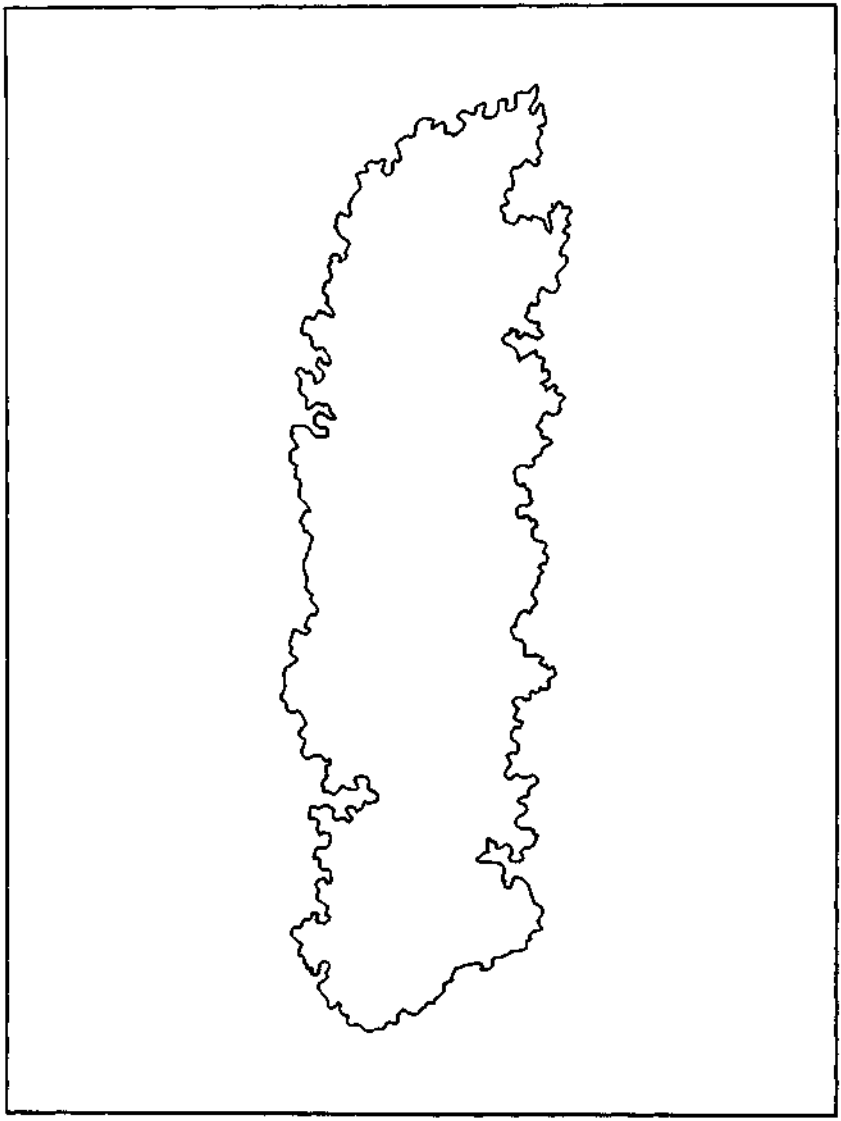


Figure 20. Hispaniola on the Ferrara manuscript of c. 1502.

that is, a map depicting Columbus's ideas and geographical theories. Such a map, in depicting Hispaniola as Cipango, might show it with the traditional shape and orientation of Cipango.

Hapgood and Levillier identify the island of *Elcezire Izle despanya* (i.e., Hispaniola) on the Piri Reis map as Cuba, apparently disregarding the names inscribed upon it, in order to support their own interpretations of the map.[27] Hapgood sought to show that extensive regions of Antarctica and North America, not previously explored and charted when the Piri Reis map was drawn in 1513, were in fact mapped by a pre–Ice Age civilization.[28] Levillier, with less grandiosity, sought to show in the Piri Reis map evidence of extensive explorations by Amerigo Vespucci in the New World, including Florida.

It may be worth pausing here a moment to discuss some of the reasons why Hapgood claimed that the island of Hispaniola on the Piri Reis map is Cuba instead. Hapgood begins by asserting that "Cuba was wrongly labeled *Espaniola*" (Hapgood's italics). Rather than a description of a datum on the map or a premise of a logical argument, this is what Hapgood seeks to prove. He begins his argument by stating this, his conclusion, as though it were a fact. It follows (according to Hapgood) that this mislabeling shows that "[n]othing could better illustrate how ignorant Piri Re'is was of his own map." Because, in fact, Cuba is not mislabeled as Hispaniola, that is, it is the island of Hispaniola that is labeled Hispaniola, it does not follow that the Turkish admiral was ignorant of his own map; the ignorance seems to be on the side of Hapgood, who apparently chose to ignore the place-names written on the island on the map and known to him through his reading of both Afetinan and Akçura.[29] Viewing this depiction of "Cuba" (actually Hispaniola) euhemeristically, Hapgood decides that the reason the western half of "Cuba" is missing is that "when the [source] map [of Cuba] was drawn, all of western Cuba was still beneath sea level." This sort of misinterpretation of geographical forms and features on old maps has previously been addressed.

Noting the similarity of this "Cuba" (actually Hispaniola) to the cartographic images of Cipango on maps of the late fifteenth and early sixteenth centuries, Hapgood concludes that "a map of a thus truncated Cuba was well known in Europe before the first voyage of Columbus," that is, that the image of Cipango, i.e., Japan, on these early maps is actually copied from a pre-Columbian map of a half-submerged Cuba! Hapgood's logic is not only upside-down but also inside-out. This argument leads Hapgood to suggest that Columbus had maps of the Caribbean before his first voyage. It seems difficult to believe that Hapgood really meant all he said. All of these statements regarding the identification of Hispaniola on the Piri Reis map as "Cuba" have their origin in Hapgood's refusal to accept at face value the Columbian place-names

inscribed upon the landforms that conformed to Columbus's geographical conceptions of these islands.

By turning the island of Hispaniola on the Piri Reis map 90° counterclockwise so that its orientation matches the island in reality rather than Columbus's conception of Cipango, we can see the coastlines visited and mapped by Columbus (see fig. 18). This is most apparent in the matching coastlines from Cayo Levantado in Bahía de Samaná to Cabo Falso. The distinctive large bight on the south coast that includes Bahía de Ocoa is well defined. The large harbor on the south side would be the mouth of the Río Haina, chosen by Columbus as the location for the third Spanish settlement in Hispaniola.[30] The two large harbors on the north coast might be Bahía de Mansanillo and Puerto Plata. Notice that the west coast of Hispaniola and the Golfe de la Gonâve (or Golfe des Gonaïves or Gulf of Gonave) are missing from the Piri Reis depiction of Hispaniola. This supports Piri Reis's assertion of the Columbian origin of the source map for this region of his map because Columbus never visited these western shores of Hispaniola.[31]

To the possible objection that it seems unreasonable, inconceivable, or incongruous that Columbus (or any other mapmaker) would turn the island of Hispaniola 90°, we have only to look to other sixteenth-century maps to find similar mistakes. For example, the east coast of Newfoundland may be turned clockwise 90° on the La Cosa map of 1500[32] and the Pesaro map of c. 1502–10.[33] Greenland may be turned 90° on the La Cosa map[34] and is turned almost 90° on the King-Hamy-Huntington map and the British Museum Additional MS 31316, folio 5, map. On the Harleian world map of c. 1544, a duplicate, oversized version of Vietnam's east coast is misplaced in the Southern Hemisphere.[35] Some of the islands of the Philippines are upside-down on the Vopell Globe of 1536.[36] On the Pesaro map the place-names along the coast of Newfoundland are in reverse order.[37] It has been suggested that Newfoundland is depicted upside-down on the planisphere of 1566 by Desliens.[38] Most maps of the late sixteenth and early seventeenth centuries depict the coast of Maine, which runs southwest-northeast, as being west-east. It is not uncommon on old maps for geographical features to be scaled incorrectly or misplaced or even be hypothetical. Some of these errors wherein islands and other features were rotated, inverted, or grossly misplaced were due to copying errors, misinterpretations of difficult or ambiguous texts, the cosmological theories of the mapmaker, or the politics of the map's recipient.

The depiction of Hispaniola on the Lusitano-Germanic maps, such as the Cantino (1502) and the Canerio (c. 1505), and that of Bordone's *Isolario* (1528), derived from the Portuguese Padrão of c. 1502–7, bears a remarkable resemblance to the depiction of Hispaniola on the Piri Reis map. Although Hispan-

iola on the Cantino, Canerio, and Bordone maps is correctly shown with an east-west orientation, the Golfe de la Gonâve is minimized and the coastline from Cabo Beata to Cabo Tiburon forms most of the west coast of Hispaniola, as on the Piri Reis map. Both the Hispaniola of the Piri Reis map and the Hispaniola of the Cantino map, typical of the Lusitano-Germanic maps, diminish Samana Bay on the northeast coast and exaggerate the harbor at Puerto Plata on the north coast of Hispaniola. The Hispaniola of the Cantino map, which is a copy of the Portuguese Padrão, which, in turn, copied Spanish maps in the depiction of the Caribbean and West Indies, appears to represent a transitional form between Columbus's image of Hispaniola as Cipango and a truer depiction of Hispaniola based on later knowledge.[39]

It appears that prior to the map of Hispaniola made by Andre Morales in 1508, the cartographic depictions of Hispaniola did not include a large bight or indention at the eastern end representing the Gulf of Samana. The depictions of Hispaniola on the Piri Reis map, the Cantino map, and the Canerio map conform to this pre-1508 delineation and further substantiate the early dating of the source map used by Piri Reis in compiling his representation of Hispaniola, Cuba, and the Bahamas.[40]

The various inlets, bays, capes, and promontories of the coastline of Hispaniola, as seen by Columbus on his first and second voyages, are preserved in the depiction of Hispaniola on the Piri Reis map. More than merely a depiction of Cipango, this island on the Piri Reis map is actually Hispaniola copied from Columbus's map of his voyages and discoveries in the West Indies. The delineation of Hispaniola on the Piri Reis map is Columbus's delineation.[41]

Surrounding Hispaniola on the Piri Reis map are several named islands, some of which can be identified with Columbus (see fig. 21).

Birbiniş,[42] or *Birbinish*, the name of an island off the south coast of Hispaniola on the Piri Reis map, is obviously bir biniş, Turkish for "long cloak," a translation apparently made by Piri Reis of the island name Alto Velo, Spanish for "high sail," "high veil," or "high cloak." Alta Vela (the present name), the sail-like rock island off the southernmost point of Hispaniola, was discovered and named by Columbus at the end of August 1494 on his return from Cuba to Hispaniola during the second voyage.[43] As with other place-names we have seen, *Birbiniş* seems to have been applied in error to the feature next to where it was on the Columbus source map, by either Piri Reis or his calligrapher (see fig. 30, p. 126). Figure 21 shows the position of the place-name, as inscribed upon the map. Figure 22 shows the place-name *Birbiniş* relocated for our purposes to its presumably correct position next to what would be the present-day island of Alta Vela (see fig. 18).

Bazi döküntü[44] is the name for a diamond-shaped area of shoals to the

Table 6. Place-Names on the Bahamas

Key Letter	Transliteration from the Map	Probable 16th-Century Identification	Probable Modern Identification
AD	*Birbiniş*	Alto Velo	Alta Vela
AE	*Bazi döküntü*	"Some shoals"?	Sargasso Sea?
AF	*Triz matos*	Tres Matas?	?
AG	*Barbura*	Babura, Barbulca, or Babueca	Turks Islands
AH	*Ile verde*	Isla Verde	Great Inagua Island?
AI	*Trispoze*	tres mill passos?	?
AI	*Trispoze*	tres pozos	?
AJ	*Sandani*	Sant Nicolas?	Cap du Môle St.-Nicolas
AJ	*Sandani*	Santiago, Sant Iago, Sant Jago, San Diego?	Jamaica?

northeast of Hispaniola (at 90°) on the map. This shoal is depicted on the map with small crosses, conforming to the standard practice of portolan charts. The place-name *Bazi döküntü* is Turkish for "some debris" or "some wreckage" or "some shoals." As "some shoals," and because of its placement in toward the mid-Atlantic, it may allude to the Sargasso Sea, sometimes depicted on maps of the fifteenth century, such as the mar di baga or mar de baga on the Andrea Bianco charts of the Atlantic of 1436 and 1447.[45] The Portuguese *baga* (berries)[46] may have been present on a map used by Piri Reis and misread by him as *bajo, bavo, bazo, baio, bajío, baxo,* etc., Portuguese and Spanish for "shoal" or "reef." Possibly, because the Ottomans had no firsthand experience with the mid-Atlantic, Piri Reis misinterpreted the indication of the Sargasso Sea on a Portuguese map as a shoal region. Other customarily mid-Atlantic Ocean features, besides this possible depiction of the Sargasso Sea, from portolan charts that appear in the western North Atlantic in New World regions on the Piri Reis map are the legendary island of Antilia, the island of Vaka, and the adventure of St. Brendan and the whale.

Josiah Marvel suggests that *Bazi döküntü* may be the Mouchoir Bank at the southeast end of the Bahamian archipelago, although it seems to be placed too far from Hispaniola on the Piri Reis map.[47] Marvel has conjectured that *Bazi döküntü*, as "some wreckage," alludes to the two ships of Vicente Yánez Pinzón that were wrecked upon the shoals then known as Los Ojos de la Babura during a hurricane in 1500. If this feature denotes a wreck of 1500, then it does not come from the Columbus map of 1498, which Kahle postulated and Marvel

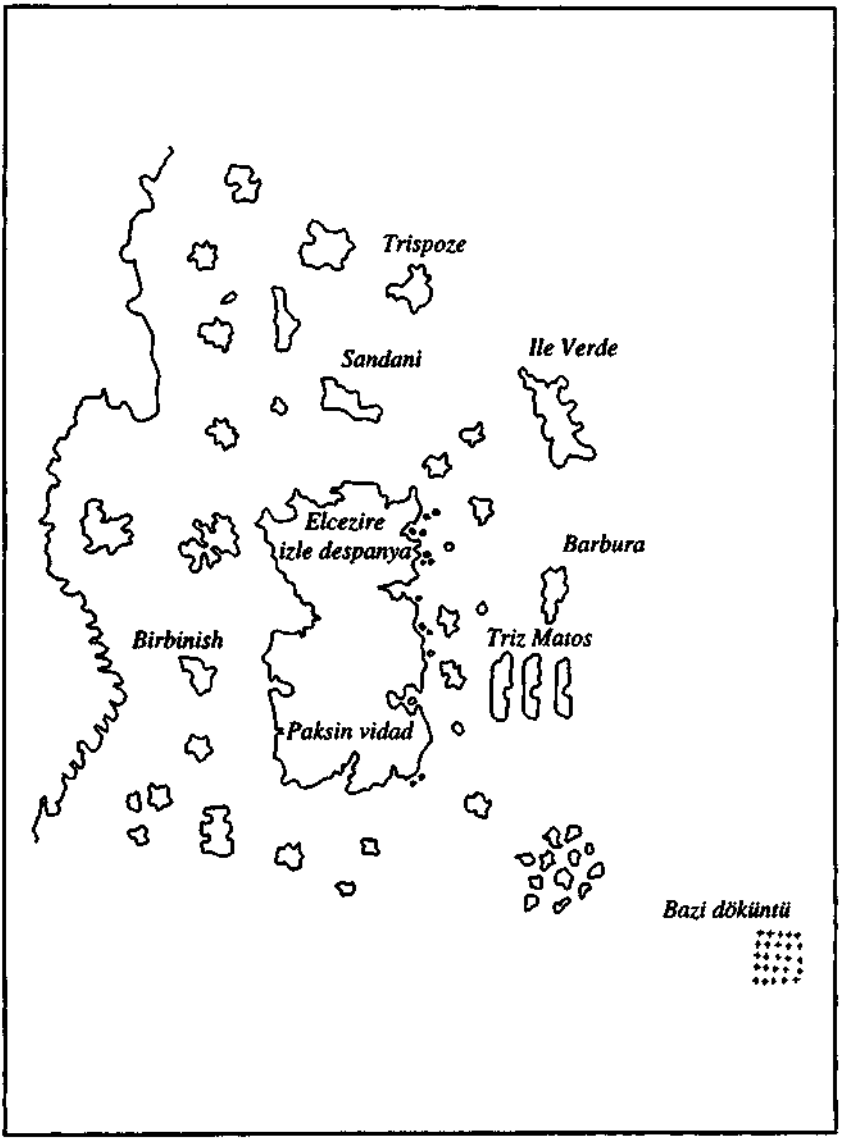


Figure 21. Hispaniola and the Bahamas on the Piri Reis map.

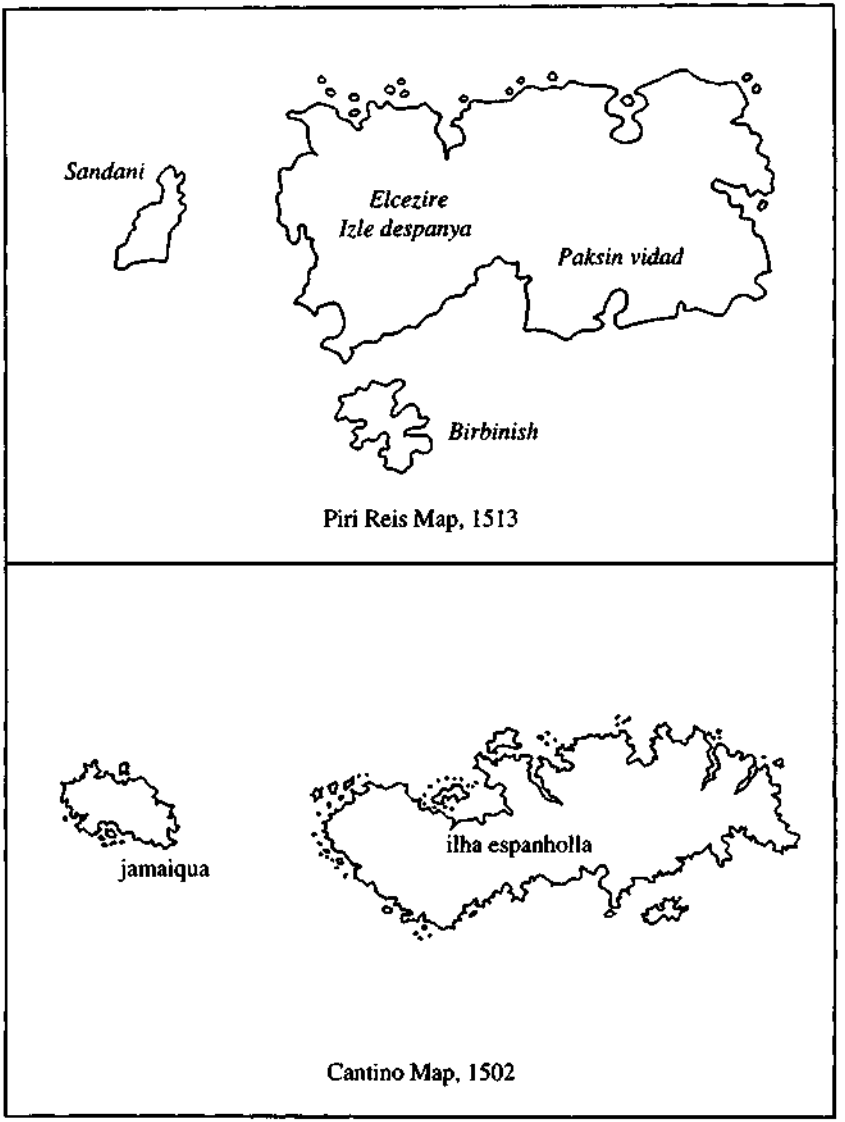


Figure 22. Hispaniola on the Piri Reis map (turned 90°) and on the Cantino map of 1502.

accepted.[48] The Mouchoir and Silver Banks were typically shown combined on manuscript maps of the early sixteenth century into a large diamond or lozenge of dots and crosses similar to the depiction of *Bazi döküntü* on the Piri Reis map.

Triz matos üc deliler demek olur[49] is the inscription next to three conventionally drawn islands to the north of Hispaniola.

27. Triz matos, that is to say, the three madmen [?].

It has also been variously translated as Triz Matos, that is to say, the "Three Fools," the "Three Drunkards," the "Three Guides," and the "Three Landmarks." These various interpretations are due to the similarities of the Turkish words *matiz* (drunkard), *matuh* (lunatic), *delil* (guide, hence, landmark), and *deliler* (madmen)[50] and the Spanish word *motos* (landmark).[51] Kahle also suggested a connection with *matón*, a Spanish colloquialism for "bully" or "ruffian."[52]

Marvel speculated that the name *Triz matos* may be related to the place-name Triango.[53] Triango and Triangulo were names for a Bahamian island (possibly San Salvador, or Watling Island) depicted on some maps and toponymies from c. 1530 to 1567 and sometimes identified with the landfall island of Columbus's first voyage.[54] Its occurrence on the Piri Reis map of 1513 seems, however, to be too early.

Or it might be *tres matas*, Spanish for "Three Mastic Trees," a commercial product whose resin was made into medicine and which Columbus found on his first voyage.[55]

There is also a Turkish nautical term, *matiz* or *matis*, meaning "to splice together two rope ends," and perhaps in some manner therein lies the origin of this place-name.[56]

Barbura was one of the names used by the Spanish for the islands and cays of the Turks Bank immediately north of Hispaniola, and it is preserved on the Piri Reis map.[57] Other variants of this native Taino name[58] used by the Spanish were Babueca, Babura,[59] Barbua,[60] Baburca,[61] Bubulca,[62] Bulbulca,[63] and Barbulca.[64] The name, usually as Babueca, continued to be used by the Spanish and others for these islands and shoals for another three hundred years. The Turks Islands were first visited by Martín Alonso Pinzón in the *Pinta* in December 1492 during Columbus's first voyage, and this is undoubtedly how Columbus came to know their native name and location so that it could be included on his map.[65]

Ile verde is the name given on the Piri Reis map to an island to the northwest of Hispaniola.[66] The name, Isla Verde, is Spanish for "Green Island."[67] As a descriptive term, it might have been applied by Columbus, or any other earlier

voyager, to almost any of the islands he saw on his voyages.[68] Also, the name Verde was given by Columbus to a cape or point of land on the third island, i.e., Fernandina, he visited during the first voyage before he arrived in Cuba.[69] Piri Reis may have thought Cabo Verde was the name of an island instead.

Or this *Ile verde* might be the small Cay Verde situated on the Columbus Bank between the Ragged Islands and Cuba, and possibly seen by Columbus on 26 or 27 October 1492, although it is not recorded in the copy of the *Diario,* or ship's log, of the first voyage that has come down to us. Cay Verde is in the same approximate relative location to Cuba and Hispaniola as *Ile verde* is to Cuba and Hispaniola on the Piri Reis map. The name Cay Verde for an island in this region was in use by at least the end of the sixteenth century and maybe earlier. The shape of *Ile verde* from the Piri Reis map is very similar to the "Is. Verde" in this same area off the coast of Cuba on the map by Cornelius Wytfliet of 1597. More significantly, the shape of *Ile verde* and its location in relation to Hispaniola (*Elcezire Izle despanya*) is strikingly similar to Great Inagua, an island probably visited by Martín Alonso Pinzón on his seven-week sojourn to Babueca during Columbus's first voyage.[70]

Trispoze could be read as the Spanish, Tres Pozos, meaning "Three Wells," and may indicate a feature noted by Columbus but not recorded in the *Diario.*[71] Marvel has suggested that the "three wells" are ponds of fresh water found by Columbus on the island in the Bahamas that he named Isabela on his first voyage.[72] In the *Diario,* Columbus records that there were some big lakes on Isabela.[73] During his return from Central America and Jamaica on the fourth voyage, Columbus stopped at the Morant Cays to the southeast of Jamaica and obtained fresh water by digging holes in the sand. He named the cays Las Islas de los Pozos, that is, the "Isles of the Wells."[74] In the same area as the name, *Trispoze,* is on the map, Columbus described in the *Diario* a large bay east of Cabo Lindo in Cuba as being a pozo, that is, a stopping place.[75] Perhaps there is a connection to *Trispoze.*

The name *Sandani,*[76] due west of Hispaniola on the Piri Reis map, may be "Santa Ni," a truncated Sant Nicolas, the name given by Columbus to a cape and harbor at the northwest end of Hispaniola, the modern Môle St. Nicolas.[77] In describing this harbor in the *Diario,* Columbus wrote that it extended into the island of Hispaniola for "tres mill passos," i.e., three thousand passos.[78] Passos are paces of five Roman feet.[79] Possibly this description, written by Columbus on his map and either shortened as *tres passo* by him or a copyist, or misread by Piri Reis or his calligrapher, was the origin of the name *Trispoze* discussed earlier. A similar shortening of a name also occurs on the Piri Reis map with the Virgin Islands. Columbus named them Las Once Mil Virgenes, the "Eleven-Thousand Virgins" in Spanish, but on the Piri Reis map the name

is *Undiziverjine,* meaning the "Eleven Virgin[s]." Did Piri Reis or his calligrapher drop the "thousand" (*mil*) in both instances?

Perhaps, however, the name *Sandani* is a corruption of Santiago (Sanctiago, Sant Iago, Sant Jago, or San Diego), the name Columbus gave to the island of Jamaica when he discovered it on his second voyage,[80] although it was rarely called that, its native name prevailing. The relative position of *Sandani* to *Elcezire Izle despanya,* i.e., Hispaniola, on the Piri Reis map bears some slight comparison with that of Jamaica to Hispaniola on the Cantino map (see figs. 18 and 22). The island of Jamaica is not obvious on the Piri Reis map, as is the case with Hispaniola and Cuba. G. R. Crone suggested Jamaica may be the largest and more southerly of the small islands on the Piri Reis map between Cuba and Hispaniola and near Puerto Rico.[81] Hapgood thinks Jamaica is the island *Birbiniş,* which, by its name, is identified with the modern Alta Vela at the southern point of Hispaniola.[82] As we have seen, the place-name *Birbiniş* "migrated" to a nearby island on the Piri Reis map, so Hapgood's identification is possible.

Kahle suggested that the name *Sandani* is Guanahani, the native Taino name for the Landfall Island of Columbus.[83] The position of *Sandani* in relation to Cuba, Hispaniola, and the other islands on the Piri Reis map appears, however, to preclude this possibility. The Landfall was on the eastern fringe of the Bahamian archipelago. *Sandani* appears to be further to the west.

The number of islands of the present-day Bahamian archipelago shown on the Piri Reis map is greater than Columbus had seen. As we have seen, at least one of the islands shown, *Barbura* (Turks Islands), and possibly others, such as *Ile Verde* (Great Inagua Island?), are probably due to information Columbus received from Martín Alonso Pinzón rather than at firsthand. We might speculate that the others shown in the Columbian section of the Piri Reis map and copied from the Columbian source map used by Piri Reis were based on information Columbus received from the natives. Some of these islands may also represent islands off the east coast of Asia that Columbus expected to be there according to the reports of Marco Polo and the maps of Paolo dal Pozzo Toscanelli (1397–1482), Henricus Martellus (fl. late fifteenth century), and Francesco Rosselli (1445–c. 1513).

10 *Cuba and Central America*

The island of Cuba is depicted as mainland on the Piri Reis map in accordance with the opinion of Columbus, who believed that Cuba was a great cape of Asia.[1] During the first voyage he identified Cuba as the mainland of China, even sending an emissary into the interior with a letter from Ferdinand and Isabella to the Grand Khan.[2] He continued to identify Cuba as the mainland of Asia.[3] On the second and fourth voyages, Columbus equated the native place-name Mago, a region on the south side of Cuba, with Mangi, the name of a province in southern China bordering upon Cathay, as recorded by Marco Polo.[4] The place-names on this mainland on the map and on the islands offshore, all from Columbus's second voyage, clearly identify it as Cuba (see fig. 23).

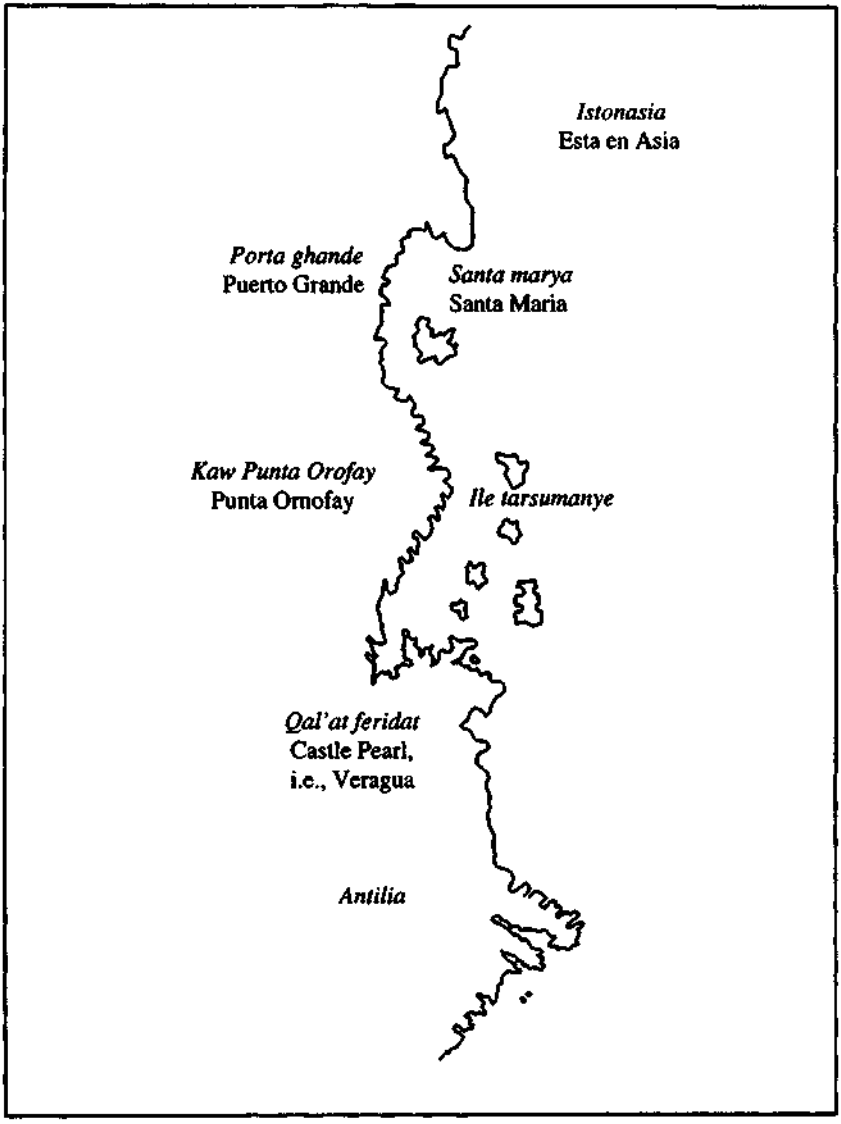


Figure 23. Cuba and Central America on the Piri Reis map.

Table 7. Place-Names on Cuba and Central America

Key Letter	Transliteration from the Map	Probable 16th-Century Identification	Probable Modern Identification
AK	*Istonasia*	"Esta en Asia"	"This is in Asia."
AL	*Porta Ghande*	Puerto Grande	Guantanamo Bay
AM	*Santa marya*	Santa maria	Cayo Largo?
AN	*Ile tarsumani*	?	?
AO	*Kaw Punta Orofay*	Cabo y Punta Ornofay	near Rio San Juan, Cuba
AP	*Qal'at faridat*	Castella Veragua	Panama
AQ	*Antilia*	Antilia	Mainland America

Istonasia[5] appears to be the Spanish "Esta en Asia," that is, "This is in Asia,"[6] appropriate words to be found on the map so near to Cuba, which Columbus believed to be the most eastern part of mainland Asia.

Porta ghande[7] is Puerto Grande, Columbus's name for modern Guantanamo Bay in Cuba, discovered on his second voyage.[8] The Piri Reis map is the only map that has this Columbian place-name.

The name *Kaw Punta Orofay,*[9] i.e., Cabo Punta Ornofay or "Cape Point Ornofay," is the region on the south coast of Cuba called Ornofay by the natives Columbus found there, also on his second voyage.[10] It is possible, however, given the orthographic transformations that occur in transliterating from a Native American language to Spanish to Ottoman-Turkish and back into a European language, *Kaw* represents the name Cuba. Piri Reis (or his calligrapher) would have run together the names Cuba and Punta Ornofay from the source map to produce *Kav* (or *Kaw*) *Punta Orofay.* This name, *Orofay* (Ornofay), as with *Porta ghande* (Puerto Grande), is a place-name linked to Columbus, and the Piri Reis map is the only map to have it.

One of the islands on the map just off the coast of Cuba is named *Santa marya.*[11] This must be the island on the south coast of Cuba named Santa Maria by Columbus during the second voyage. Columbus's son, Ferdinand, gives the name as Santa Marta.[12] Harrisse gives the name as Isla Sancta Maria from either Columbus, Bernaldez, Las Casas, or Ferdinand Columbus without identifying the specific source.[13] Las Casas gives the name as Santa Maria.[14] The island named Santa Maria by Columbus might be the modern Cay Largo,[15] Cayo Caballones,[16] or one of the cays of the Golfo de Ana Maria.[17]

The prominent cape pointing toward Hispaniola undoubtedly is present-day Cabo Maisi at the eastern end of Cuba. The region to the north of the cape is that coast on the north side of Cuba explored by Columbus on the first

voyage, and the region to the south is the south coast of Cuba he explored on the second voyage. Columbus described the north coast of Cuba as extending northwards. He described the south coast of Cuba as extending first westward, then southward.

In describing the north coast of Cuba visited on the first voyage, Columbus wrote in his Letter to the Sovereigns, "I thought it must be the mainland, the province of Cathay. . . . At length, after the proceeding of many leagues, and finding that nothing new presented itself, and that the coast was leading me northwards."[18] In the *Diario* of the first voyage,[19] it is recorded that he said of the north coast of Cuba, "[T]his is mainland . . . and well this is shown by the sea, which comes in a way other than the way it has until now. And yesterday when I was going to the northwest I found that it was cold."[20] Columbus also records in the *Diario* that Martín Alonso Pinzón reported to him that Cuba "was a very big landmass that went far to the north."[21]

In describing the south coast of Cuba visited on the second voyage, it is recorded about Columbus that "the shores of Cuba trend so much to the southward that he thought himself at times very near the equator."[22] Michele de Cuneo's letter of 28 October 1495 records that during the second voyage Columbus believed Cuba to be mainland.[23] Of the western terminus of the second voyage, near Bahía Cortés,[24] Columbus said, "From this point onward, the coast extends southwardly,"[25] and he even compelled his pilots to declare that "from there the country turned south and southwest."[26] Crone sees this coastline on the Piri Reis map, particularly the bay with islands at the lower end of this stretch, as the same great bay on the south coast of Cuba delineated by La Cosa and Ruysch.[27]

Ile tarsumanye[28] or *Ile tarsumani*[29] is just offshore at *Kaw Punta Orofay* on the Piri Reis map. Perhaps this is El Teroneso, an alternate name during the second voyage for San Juan Evangelista,[30] the name Columbus gave to the present-day Isla de le Juventud (formerly Isla de Piños), discovered on the south coast of Cuba during the second voyage.[31] Or could it be related to the name Maia (Maya) or Maian (Maima), which Columbus supposedly heard on the coast of Honduras on his fourth voyage,[32] such as something like "Tierra de Maian"? Perhaps *tarsumanye* or *tarsumani* is a corrupted Talamanca, the name of a group of Native Americans of Central America, reported by Columbus during his fourth voyage.[33] Or could *tarsumania* be a corrupted Xamania, one of the early names for Jamaica?[34]

The Piri Reis map follows the ideas of Columbus in depicting Cuba as a mainland with a coastline that extends north and south. The same conception of the Asian mainland was depicted on maps between 1474 and 1492 by Columbus's contemporaries, Toscanelli, Martellus, Rosselli, and Behaim (see fig. 24).

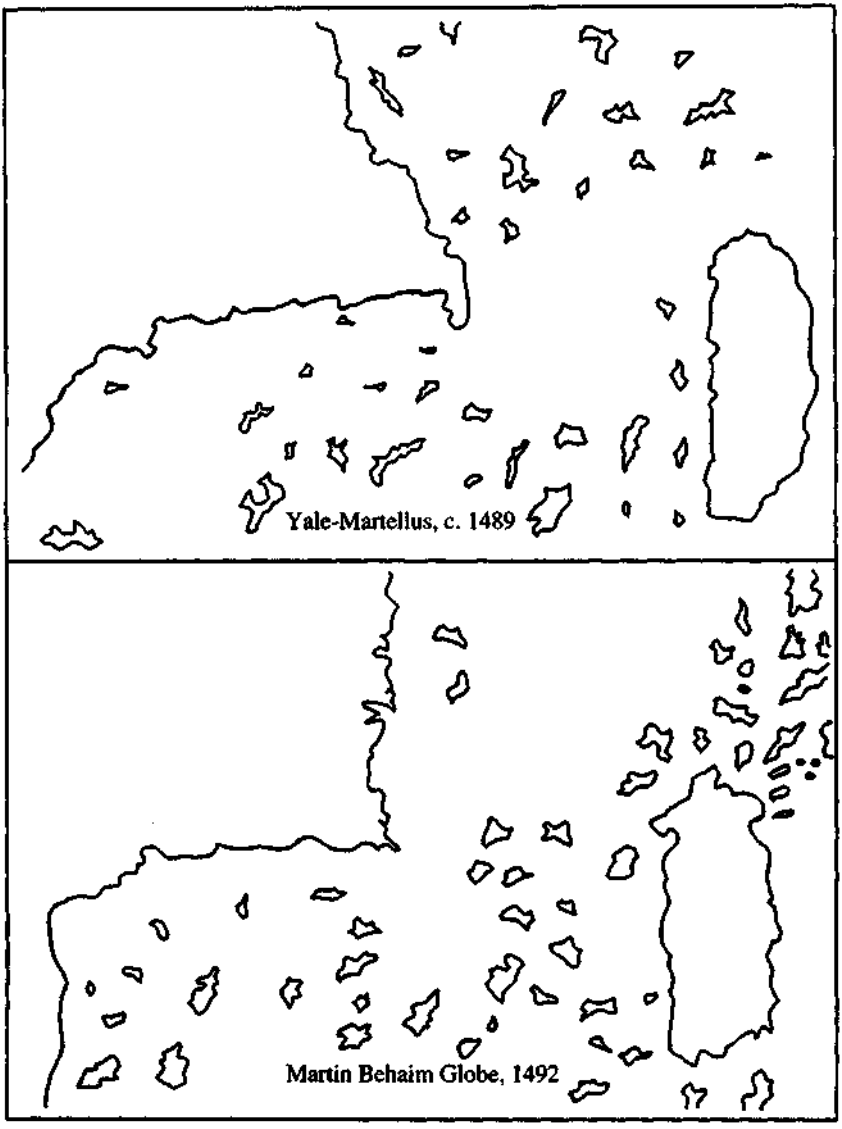


Figure 24. The Asian mainland on early maps.

On the section of this mainland to the south, which connects with South America, is a picture of a castle or fortress with an inscription beside it. This inscription is the Arabic *Qal'at feridat*,[35] which means "Castle (or Fort or Fortress) Precious Pearl."[36] Although the origin of this place-name will ultimately be shown to be from the fourth voyage of Columbus of 1502–4 along the coast of Central America, the particular form of this name on the Piri Reis map indicates this portion of the map is not copied from the Columbian source map used by Piri Reis. The demonstration of this will be shown by a comparison of the Piri Reis map and the Egerton MS 2803, fol. 8r map and the connection of *Qal'at feridat* with the place-name Veragua.

Veragua, from a native place-name Columbus picked up on his fourth voyage, became a widely used name for Panama,[37] and it occurs on many European-made maps of the sixteenth century: e.g., Martyr-Morales (1511), Zorzi (c. 1522), Monachus (c. 1526–30), Münster (1540), and Wytfliet (1597). Castello veragua (perhaps a copyist error for Costa de Veragua?) occurs on the Italian-made Egerton MS 2803, fol. 8r map of c. 1508–13 (see fig. 25). On the Egerton MS 2803, fol. 7v map, further north on the Central American coast, the name castella et prouintia de liguri, i.e., "Castle and Province of Liguria (?)" occurs with a small sketch of a castle. Liguria, of course, is the name of the region of Italy, including Genoa, from whence Columbus probably came.[38] However, this name, liguri, is probably a copyist error for lagartos, figueras, igueras, fegues, or higueras, which are variants of the name of a cape in this region on early maps.[39] Still further to the north on the coast on the same Egerton map, beside an imagined strait through the continent into the Oriental Sea, is another small sketch of a castle, but without a name. As noted earlier, conventionalized depictions of castles or fortresses were commonly used on fifteenth- and sixteenth-century maps to denote cities, towns, forts, settlements, and trading posts, whether real or imagined.[40]

The origin of the Portuguese *barroco* and the Spanish *barrueco*, meaning "pearl" and particularly "baroque pearl" or "seed pearl," is not clear. The accepted etymology[41] is that the word derives from the Latin *verrucca* and other related words meaning "wart," "hillock," "gutter made by a water-flood," and "uneven stony ground." These are all reminiscent of the appearance of a baroque pearl. It does not appear the words *barroco* and *barrueco* derive from Veragua. Although noted by the early Spanish for its gold, the region was not noted for pearls.

Beragua and Beragna were alternate spellings for Veragua and Veragna. We must conclude, based on the evidence provided by the Egerton MS 2803, fol. 8r map, that when Piri Reis read the place-name Castillo (or Castello) Veragua

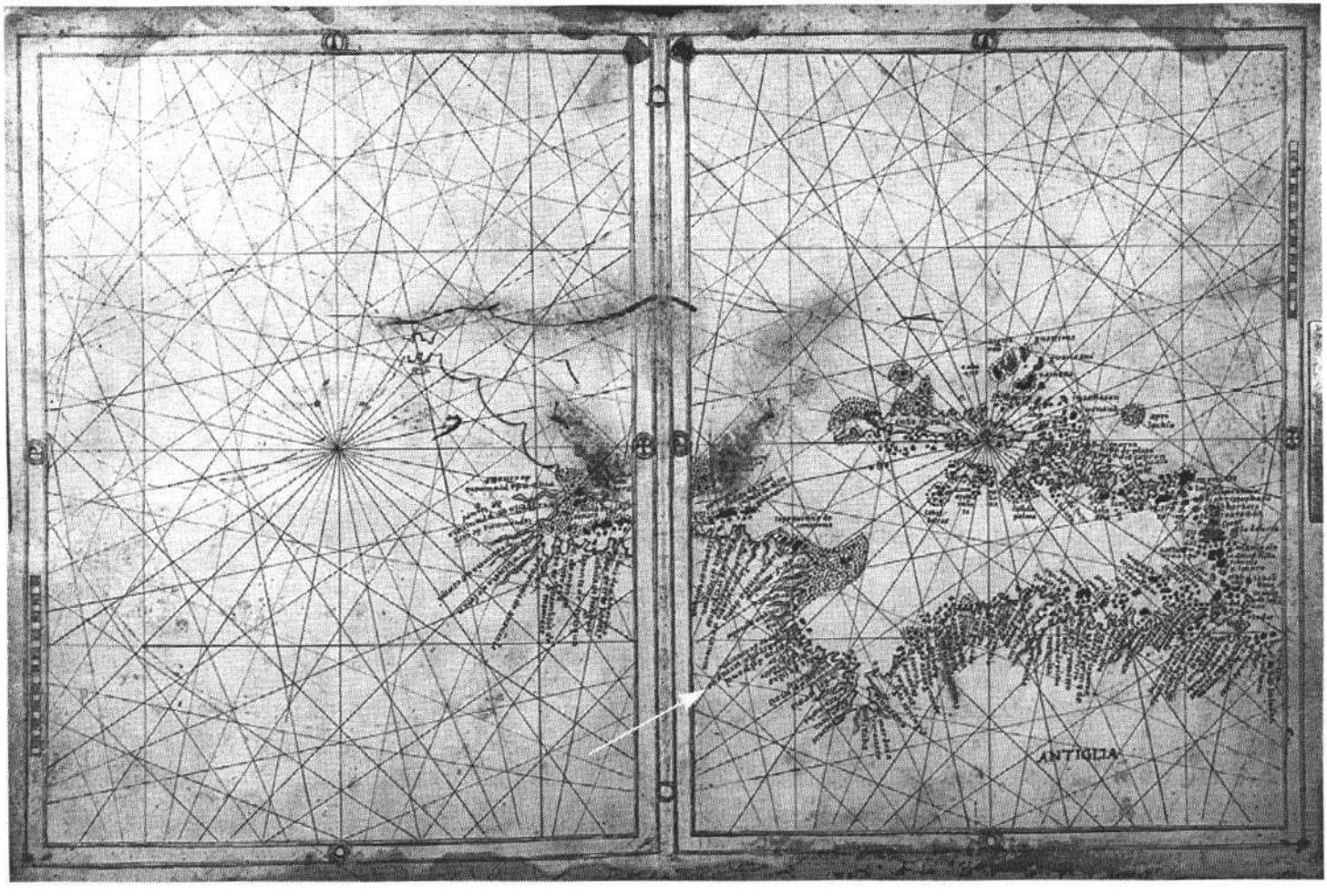


Figure 25. The Egerton MS. 2803, fol. 7v and 8r, map of Central America. The arrow indicates *Castello Veragua*. (By permission of the British Library.)

(or Beragua), probably from the same source as was used by the Italian maker of the Egerton MS 2803 map, he understood the name Veragua or Beragua to be the Portuguese or Spanish word for pearl and so mistook Castillo Beragua for Castillo de Berrucca, i.e., Pearl Castle, and hence wrote *Qal'at feridat.* The Piri Reis map has a castle on the coast similar to the Egerton MS 2803, fol. 8r map. For his depiction of Central America, Piri Reis used a map with the place-name Castillo Veragua on it, the same as the map used by the maker of the Egerton MS 2803 map. It is possible that Piri Reis and the Egerton cartographer used the same source map for this region. Perhaps the name Castillo de Beragua was akin to or influenced by Castilla del Oro, i.e., Golden Castile, the name Veragua was known by after 1509.[42]

The proximity of Veragua (Panama) to the Costa de las Perlas ("Pearl Coast," i.e., Venezuela) may have contributed to this confusion between the similar words for a place (Veragua or Beragua) and for pearls (verrucca or barrueco). In reference to the earliest voyages in this region, it was officially reported in Spain in 1504 that there was a land connection between Veragua and the Costa de las Perlas to the south.[43] In 1512, Bartolomé Columbus testified that he and his brother, Christopher, were satisfied that Veragua (Panama) and Paria (Venezuela) were of the same mainland.[44]

Although Spain and Portugal each sought to prevent geographical information about the New World from being disclosed, either to each other or to other countries, their maps (especially Portuguese) were used by Italian cartographers in the maps they made in the first two decades of the sixteenth century, as can be seen on the Pesaro map and the maps made by Canerio, Contarini, Maggiolo, Rosselli, and others. Not having sponsored explorations or colonies in the New World, the Italians did not have a vested interest in restricting the dissemination of this geographical knowledge. Italian manuscript maps of the first quarter of the sixteenth century were one of the primary means by which Europeans learned about the new Spanish and Portuguese discoveries in the west.

Because "Castle Veragua" is present on both the Egerton MS 2803, fol. 8r map, as Castello Veragua, and on the Piri Reis map, as *Qal'at feridat,* it seems likely that the source map Piri Reis used in depicting Central America was of Italian origin rather than directly Spanish or Portuguese. It is unlikely that both the maker of the Egerton map and Piri Reis would make the same error of transcription. It is, of course, possible that the name of "Castle Veragua" was present on a Portuguese source map used by both the Egerton mapmaker and by Piri Reis, although if it is true that "Castle Veragua" is a copyist error for the Spanish, Costa de Veragua, it is less likely that a Portuguese would make

this error, given the closeness of the Portuguese language to Spanish. This place-name of *Qal'at feridat*, present as Castello Veragua upon the Egerton MS 2803 map, clearly indicates that Piri Reis used a non-Spanish, i.e., Portuguese, or more likely, Italian, map from after the end of Columbus's fourth voyage in 1504 in delineating the land connecting South America with Columbus's "Cuba-as-mainland."

Even though we can only presume that the source map for Central America used by Piri Reis was Italian, there is no doubt that at least one place-name, *Qal'at feridat* (and probably the entire depiction of Central America and the north coast of South America) was from a post-1504 map, thus disproving Kahle's date of 1498 for Piri Reis's source map of the Caribbean region.

The double Virgin Islands (indicating that Piri Reis used two source maps in this region) and *Qal'at feridat* (copied by Piri Reis from a post-1504 map, probably of Italian or maybe Portuguese origin) form the two ends of a boundary. This boundary is between the regions to the south (Puerto Rico, the Lesser Antilles, Central America, and South America), copied by Piri Reis from one or more maps drawn between 1504 and 1513 that probably included Portuguese maps (as Piri Reis indicates in inscription no. 6) and possibly Italian copies of Portuguese maps, and the regions to the north (the Bahamas, Hispaniola, and Cuba), copied by Piri Reis from a map likely to be the one he claimed was made by Columbus. Veragua/Beragna (*Qal'at feridat*) would not be on any map, Columbian or otherwise, in 1498 or anytime before 1504. It is unlikely that the double Virgin Islands would be on a map made by Columbus. The indication is that the region north of the Veragua–Virgin Island boundary line is from the Columbian source map, possibly made in c. 1495–96 by Columbus or under his direction (see fig. 26).

The Columbian geographical conceptions about the new islands and lands to the west of Europe had a profound and long-lasting influence on cartography and geographical knowledge. The greatest problem of sixteenth-century geography—the geographical relationship of the transatlantic discoveries to the lands of eastern Asia—had its origin in the geographical ideas of Columbus, and much of the mapmaking of the sixteenth century can be seen as an attempt to resolve this problem. Some of the earliest maps of the sixteenth century, such as the Rosselli maps of c. 1508 and the Zorzi maplets, have place-names on the east coast of Asia that are from Columbus's fourth voyage along Central America resulting from Columbus's mistaken yet persistent belief that he was sailing among the islands and along the coast of Asia.[45] Similarly, the Contarini-Rosselli map of 1506 has an inscription next to the east coast of Asia describing how Columbus sailed westward to the province of Ciamba, the

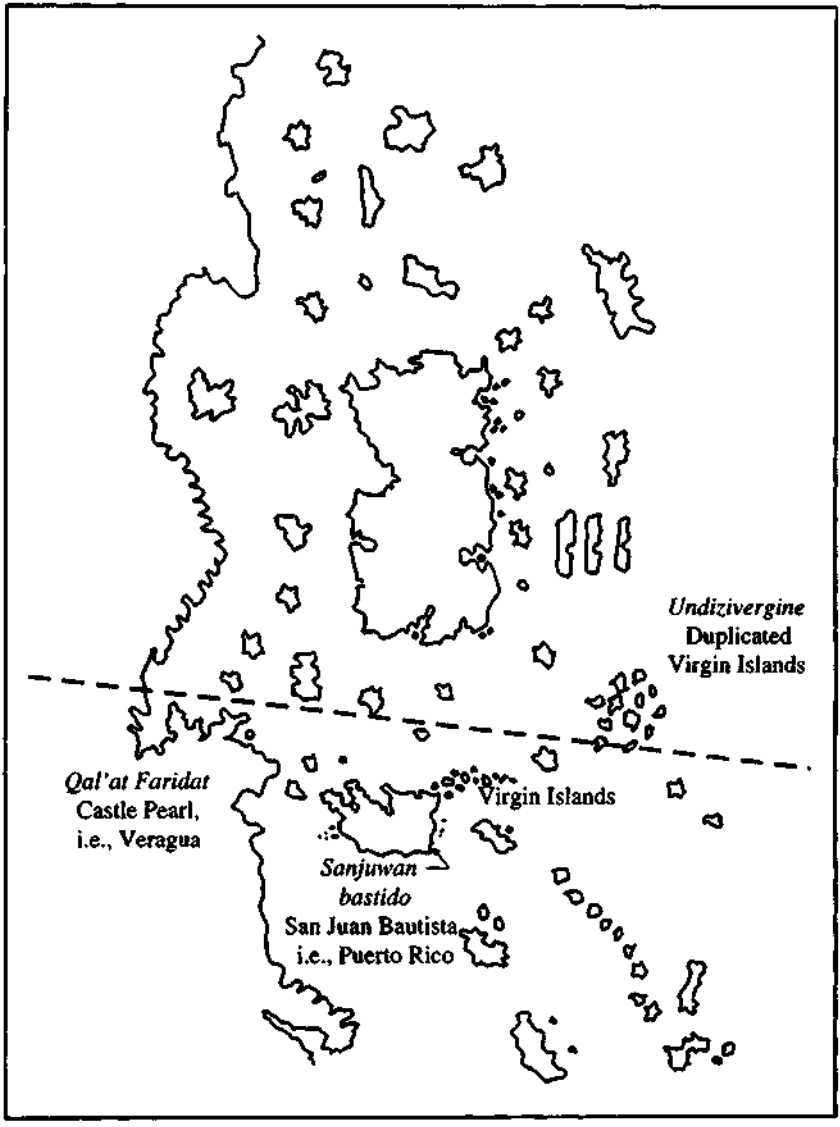


Figure 26. The reconstructed boundary line between source maps in the Caribbean.

region of China opposite Cipango.[46] The Cantino map depicts (by duplication) Cuba as a mainland, as does the Piri Reis map. The Ruysch map has an inscription that what the Spanish have named Hispaniola is also Cipango. The Piri Reis map also apparently depicts Hispaniola as Cipango. Even after cartographers decided that Hispaniola was not Cipango, the persistent Columbian belief that these new lands were Asian resulted in the identity of Cipango being transferred to the Yucatan peninsula on several maps and globes during the 1520s and 1530s.[47]

On the Ruysch and Rosselli maps, South America is a great island continent unconnected to any other continent, as Columbus believed following his third voyage. He believed South America to be the largest island in the world (Java), described by Marco Polo as being to the south and southeast of Asia. Following his fourth voyage, Columbus believed that Cuba was connected to Central America and South America.[48] This view is depicted on the Waldseemüller maps of 1507 and 1513 and the Piri Reis map of 1513.

Assuming that the depictions of Cuba, Hispaniola, and the Bahamas on the Piri Reis map were copied from the Columbus source map of 1495–96 (as appears evident), Piri Reis either disregarded possible alternative depictions of this region on the other maps he used in compiling his map or the other maps did not contain depictions of this region. This latter possibility lent itself more readily for the grafting of the Columbian source map onto it, particularly in regards to the depiction of Cuba as a mainland. Although Cuba was believed by some to be an island as early as the first voyage of Columbus, and most early maps, such as the La Cosa map and the Cantino map, depict it as an island, this was not positively determined until 1508 when Ocampo circumnavigated the island.[49]

Some commentators, such as Kahle,[50] have held that the reason Piri Reis disregarded the later, better depictions of the West Indies likely to be present on the maps he used was because he still held Columbus in high repute as a geographer and cartographer. This does not seem implausible. Piri Reis refers to Columbus in inscription no. 5 as "a great astronomer."

There were maps contemporary with Piri Reis that depicted only the eastern end of Cuba, perhaps indicative of this early uncertainty as to whether it was an island or a headland of the mainland. Examples are the King-Hamy-Huntington map and the *Orbis Typus Universalis* maps of c. 1506–20 and 1513 by Waldseemüller.[51] On the King-Hamy-Huntington map, Cuba is named "Terra," that is, "Land," instead of "Ilha," "Isla," or "Isola." Some maps (unwittingly) depicted Cuba both as a mainland and as an island, such as the Lusitano-Germanic maps, e.g., Cantino, Canerio, and Waldseemüller. Mention should also be made of the Kunstmann no. 2 map, which, though it seems

to show Cuba as an island, shows Cuba and Hispaniola at a more upright angle not dissimilar to the north-south orientations of Cuba and Hispaniola on the Piri Reis map. Similarly, the famous Waldseemüller world map of 1507, because of the projection used, shows South America and the "Cuban mainland" at an angle not unlike that shown on the Piri Reis map.

It appears that in his map compilation process Piri Reis grafted the Columbian source map of c. 1495–96 onto a Portuguese or Italian base map. The Columbian conception of the transatlantic lands and islands (as recorded in Columbus's writings and the writings of his contemporaries) and the Toscanelli-Martellus-Rosselli-Behaim conception of the East Asian coast are combined with the geography of the West Indies and the Caribbean to produce the configurations of the Piri Reis map—configurations that are copied from Columbus's map. The Piri Reis map of 1513 and most other maps of the first two decades of the sixteenth century depict the results of the attempts at combining the reported geography of the new lands with the differing conceptions of East Asia envisaged by Ptolemy, Marco Polo, Toscanelli, Martellus, Columbus, and the Portuguese.[52]

On the mainland that is Cuba and Central America are three inscriptions:

1. There is a kind of red dye called vakami that you do not observe at first because it is at a distance *[illegible]*. The mountains contain rich ores *[illegible]*. There some of the sheep have silken wool.[53]

Vakami or *bakkam* is the Arabic word for logwood, dyewood, brazil, or brazilwood and the reddish dye made from the wood.

2. This country is inhabited. The entire population goes naked.

3. This region is known as the province of Antilia. It is in the west. They say that there are four kinds of parrots—white, red, green, and black. The people eat the flesh of parrots and their headdress is made entirely of parrots' wool [i.e., feathers]. There is a stone here. It looks like a black touchstone. The people use it instead of the ax. That it is very hard *[illegible]*. We saw that stone.

The headdress of parrot feathers and the hard black stone are recorded in the *Bahriye* by Piri Reis as booty that he and his uncle, Kemal Reis, captured from the Spanish (see the comments under inscription no. 5 in chapter 7). The black stone seems to be the same as was seen by Columbus in Guadeloupe during his second voyage and described above in chapter 7. The parrots with wool and the sheep with silken wool, referred to in inscription no. 1, may be related to chickens covered with wool and the beasts with the finest of all wool

described earlier by Pliny and later illustrated in South America on the Sebastian Cabot map of 1544.[54]

Part of the inscription on the mainland connecting Cuba with South America identifies the territory as Antilia.[55] Many in Europe believed (correctly) that the circumference of the earth was larger than Columbus supposed, and the Portuguese particularly did not believe Columbus had sailed far enough west to have reached the Indies.[56] They thought he had reached the legendary island of Antilia shown to the west in the Atlantic Ocean on medieval portolan charts (and so today the Caribbean islands are named the Antilles). In fact, the new lands to the west discovered in the late fifteenth and early sixteenth centuries were frequently identified with the legendary islands of the Atlantic—Antilia, Seven Cities, and Brasil.[57]

Columbus, on returning from his first voyage in 1493, stopped at Lisbon on his way back to Spain and was interviewed by King João II the Perfect of Portugal (1455–1495; reigned 1481–95), who had twice rejected Columbus's proposed "Enterprise of the Indies." According to Ruy de Pina, the official chronicler of the reign of King João II, Columbus was returning from "the discovery of the islands of Cipango and Antilia."[58]

It appears that almost immediately upon Columbus's return from his first voyage, even before he had arrived in Spain, an opinion arose among some, particularly the Portuguese, that the islands he had discovered were the islands of the legendary Antilia and not the coast of Asia. And as the regions discovered and explored by him and others expanded to include continental mainlands, the opinion continued that these lands were not Asia but the legendary islands of the medieval portolan charts. By 1501, many Portuguese believed that there was one continuous landmass from South America to Newfoundland.[59] Other cartographers believed the newly discovered lands were connected to Asia, which influenced their maps.[60]

This belief that Columbus had reached not Asia but the legendary islands in the Atlantic quickly found its way onto contemporary maps. The Cantino map, made in Lisbon in 1502, the Canerio map of c. 1505, the Kunstmann no. 2 map (an anonymous Italian copy of a Portuguese map of c. 1502–6), the Pesaro map of c. 1508, and several other early maps have inscriptions naming the West Indies the "Antilles" and attributing their discovery to Columbus.[61] In describing Columbus's discovery of Cuba and Hispaniola in the 1490s, Peter Martyr states: "But the description of the cosmographers well considered, it seems that both these, and the other islands adjoining, are the Islands of Antilia."[62] In the *Lettera* to Pier Soderini, written in 1504, attributed to Amerigo Vespucci, and first published in 1505–6, Hispaniola is identified as the island

of Antiglia, i.e., Antilia, which Columbus had discovered a few years earlier.[63] This belief that Columbus discovered the legendary island or islands of Antilia instead of Asia is the origin of the name Antilles still used to this day for the islands of the Caribbean.

The new lands in the west were commonly identified early in the sixteenth century with the legendary islands of the North Atlantic, especially Antilia and the Seven Cities. On the Egerton MS 2803, fol. 8r map of c. 1508–13, Antiglia occurs as the name of a large inland region in South America (see fig. 25).[64] Located on the North American continent on the Egerton MS 2803 world map are seven bishops' mitres representing the Seven Cities,[65] which, according to legend, were founded to the west of Europe by seven Portuguese bishops fleeing the Arab invaders in the eighth century. In this same region in North America on the Juan de la Cosa map is inscribed a barely legible legend which appears to be the words Terra Setem Civitates or Terra Septem Civitates or Tierra de Siete Ciudades, that is, the Land of the Seven Cities.[66] The North American landmass on the La Cosa map is made up of several stylized interlocking semicircles. Each of these semicircles has a river flowing from a central lake, each of which has a city in the middle.[67] These cities scattered over the continent probably represent the Seven Cities, as the bishops' mitres do on the Egerton world map. It was believed that the land discovered by John Cabot (c. 1450–c. 1498) in 1497 was the Seven Cities,[68] and it is likely that these indications of the Seven Cities in North America on the La Cosa and Egerton world maps reflect this belief. Almost immediately after their discovery, various areas of the New World were widely considered by many to be identical to the legendary islands and lands, e.g., the Seven Cities, Brasil, Antilia, Sheba, Ophir, Eden, etc., thought during the Middle Ages to exist in the Atlantic to the west of Europe or to the east in Asia. This is reflected in the name Antilia on the mainland of Central America on the Piri Reis map.

The Piri Reis map may be unique in that it has Antilia as the name for both the western continent and the legendary island in the Atlantic on the same map. Presumably, this is because Piri Reis, in compiling his map, used both portolan charts of the fifteenth century, which typically show the island of Antilia in the Atlantic, and maps of the early sixteenth century, which name the western continent Antilia, as the Egerton MS 2803, fol. 8r map has. The Piri Reis map is apparently the only map to give the name Antilia to both the legendary island and the western continent.

As has been shown, the place-name Antilia on the western continent is on that section of the Piri Reis map that is copied from a non-Columbian, post-1504 map. This further demonstrates the belief of many that Columbus failed to reach the Indies and instead sailed to the islands of Antilia.

When Columbus arrived off the coast of Honduras on his fourth voyage, he believed that the land was connected to Cuba (Columbus's Mangi or mainland Asia) to the north. This fit his conception of the coast of East Asia. When he sailed south to Panama, he learned that the Central American coast was connected to South America. The Piri Reis map displays these two features of Columbian geography: "Cuba-as-mainland" connected to Veragua, and Veragua connected to South America.

The "Cuban mainland" of Columbus depicted on the Piri Reis map is markedly similar to the mysterious northwest landmass on the Cantino map and other Lusitano-Germanic maps derived directly or indirectly from the Portuguese Padrão, e.g., the Canerio, Waldseemüller, and Ruysch maps. The Cantino map itself is mutilated, its edges having been trimmed in the nineteenth century. The complete delineation of the mysterious northwest landmass as it must have originally appeared is shown on the Canerio map of a couple of years later (see fig. 27). The identity of this mysterious landmass is a persistent riddle in the history of cartography. Although the landmass bears a superficial resemblance to Florida, the Cantino map, which contains its earliest depiction, is dated 1502, eleven years before the discovery of Florida by Ponce de Leon.

Six hypotheses have been offered since the mid-nineteenth century as to the identity of the continental landmass represented on the Lusitano-Germanic maps. These hypotheses are that it is (1) the Asian coast, similarly seen on other contemporary maps (see fig. 24 for some examples); (2) the Yucatan peninsula, turned 90° and displaced to the north of Cuba; (3) Columbus's conception of Cuba as the Asian mainland; (4) Florida, the southeastern United States, and the Gulf of Mexico; (5) purely imaginary; or (6) a composite of several sources, chiefly Columbus's conception of Cuba as the Asian mainland combined with accounts of the voyages of John Cabot, the Corte Reals, and possibly the spurious "voyage" of Amerigo Vespucci of 1497.[69]

Hypothesis no. 1 is unlikely because the Asian coast is already shown on the right side of the Cantino map. Hypothesis no. 2 requires the acceptance of unknown navigators (critical thinking and analysis forbid the creation of additional unknown entities) and a rather severe distortion of the Yucatan to equate with the Cantino landmass. Hypothesis no. 5, though superficially the simplest of the hypotheses, actually does not explain the presence of the landmass on the Cantino map. Hypothesis no. 6 (favored by the present writer) is a variant or elaboration of Hypothesis no. 3.

In general, most scholars who have examined the problem have concluded that the mysterious northwest landmass on the Cantino map is either Hypothesis no. 3 or Hypothesis no. 4.

Hypothesis no. 4, as with no. 2, postulates unknown voyagers for which the

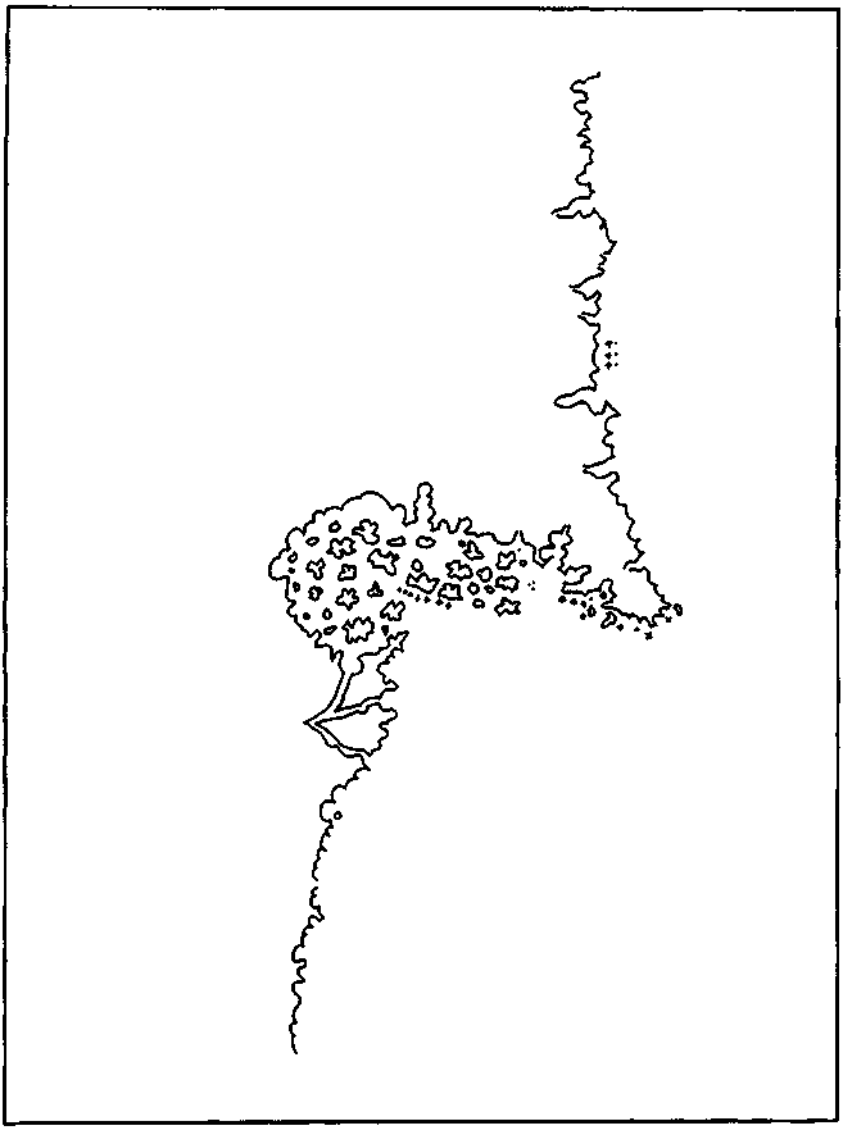


Figure 27. The mysterious northwest landmass on the Canerio map of c. 1505.

only evidence of their existence is the presence of the landmass on the Cantino map. This argument lacks force because it is circular. Also, some features of the Cantino landmass such as the smallness of the supposed "Gulf of Mexico" and the myriad islands filling this gulf do not, in fact, much resemble what they are claimed to be by proponents of Hypothesis no. 4.

Hypotheses 3 and 6, however, have in their favor such support as this landmass being labeled "Terra de Cuba • Asie Partis" (Land of Cuba • Part of Asia) on the Carta Marina map of 1516 by Waldseemüller.[70] This points directly to the origin of this landmass in Columbus's conception of Cuba as the Asian mainland. The name Cuba, although barely legible because of effacement, was also given to this landmass on the Ruysch map of 1507–8.[71] The Cantino landmass matches the configuration of both the east coast of Asia, as believed by Columbus and all other European geographers, and the coasts of Cuba as described by Columbus.

Of the twenty-three place-names on the Cantino-Canerio landmass, most appear to be descriptive terms derived from prominent features along the coast or from events that occurred along the coast during one or more voyages. There are, however, several place-names that indicate the sources used by the cartographer in making the Cantino map. These place-names have been analyzed by George E. Nunn.[72] He identifies the sources of these particular place-names on the Cantino map as the Juan de la Cosa map, Columbus's first and second voyages along the coasts of Cuba, the voyage of 1502 of Miguel Corte Real, and possibly the report of a voyage by Amerigo Vespucci.

One of the place-names undoubtedly indicates that it is Columbus's conception of Cuba as a mainland that forms the basis of the Cantino landmass. This is "C. do fim do abrill," that is, "Cape of the End of April." During the second voyage, Columbus crossed the Windward Passage from Hispaniola to Cabo Maisi, Cuba, on 30 April 1494. It appears certain that the origin of "Cabo do fim do Abrill" is derived from this event.[73]

An apparent stumbling block to Hypotheses 3 and 6 is that because an island shaped like Cuba and at the proper location in the Caribbean is shown on the Cantino map, the northwest landmass cannot also be Cuba. Nunn, however, has shown how this duplication of Cuba on the Cantino map, once as an island labeled Isabela and again as the unnamed continental landmass, probably arose in the mind of the Cantino map's Portuguese cartographer. These errors resulted from his efforts to combine two sets of apparently contradictory information. One set was that of Cuba as an island and Cuba as a mainland. The other set was that of Isabela as the chief city of Hispaniola, Isabela as an alternate name for Hispaniola, and Isabela as the name of a triangular island in the Bahamas near Cuba.

Nunn identified the source of the confusion regarding these several "Isabelas" as Fernand Perez de Luna, a public notary of the city of Isabela in Hispaniola. The relevant passage describes Columbus's voyage to Cuba, called Juana by Columbus, during the second voyage:

> "[H]e left the said city of Isabella the twenty-fourth day of April and came to seek the land of the said Juana nearest to the island of Isabella, which is shaped like a triangle extending from east to west, and the point is the eastern part, twenty-two leagues from Isabella."[74]

This single sentence includes all three references for "Isabela"—the city, the island of Hispaniola, and the island in the Bahamas—and the triangular shape that became incorporated into the Cantino map. The efforts of the Portuguese cartographer to combine this description of a region that included a continental Cuba and an island named Isabela to the east of Cuba with a Spanish map of the same region that depicted an insular Cuba resulted in the depictions on the Cantino map. This explains how on the Cantino map an island shaped like Cuba but labeled "Isabella" came to be shown between Hispaniola and Columbus's "Cuban mainland."

The presence of the wedge-shaped continental landmass with Cuban placenames used by Columbus in the Columbian section of the Piri Reis map supports both Hypotheses 3 and 6. This landmass on the Lusitano-Germanic maps, typified by the Cantino and Canerio maps, is either Columbus's conception of Cuba as the Asian mainland (3) or a composite based on Columbus's conception of Cuba as mainland (6). The present writer believes that what is depicted by the mysterious northwest landmass on the Cantino map is best explained by Hypothesis no. 6.[75]

Parrots are shown perched on eleven of the islands on the Piri Reis map. Some of these islands are *Istonasia, Trizpose, Triz matos, Elcezire Izle despanya, Undiziverjine,* and *Antilia.* Parrots were originally associated with the exotic East but were soon linked with the New World, particularly South America, on maps of the early sixteenth century, e.g., the Cantino map of 1502 and Waldseemüller's maps of 1507 and 1516.[76]

Kahle, in his works on this map in the 1930s,[77] supposed that these islands with parrots were copied by Piri Reis from the Columbus source map and that they represented islands Columbus had expected to find, according to the map he had with him on the first voyage, but had failed to find in the expected location. Kahle suggested that Columbus marked these islands with a parrot to denote their imaginary status. Kahle further suggested that Columbus, instead of marking the newly discovered islands onto a blank vellum chart, as was the practice of pilots and sailing masters, merely added the newly discovered is-

lands to the map he carried with him and marked with a parrot those islands already on the map that he found were not in the position indicated by that map. Kahle does, however, recognize some problems with this hypothesis, such as the presence of parrots on *Undiziverjine* (Virgin Islands) and on *Izle despanya* (Hispaniola), which, of course, are not imaginary islands.

We know Columbus did carry a map on the first voyage,[78] and it apparently was the famous Toscanelli map.[79] According to Kahle, however, the Columbus source map imbedded in the Piri Reis map is from the third voyage of 1498, so it is doubtful that Columbus would continue to depict nonexistent islands from his first voyage on this later map.[80]

Another reason for doubting Kahle's "Parrot Theory" (i.e., that the islands with parrots are nonexistent or legendary islands not found by Columbus at the locations he had expected, as indicated by the Toscanelli map) is that on the second world map of Piri Reis,[81] made in 1528, of which only the northwest quarter of the Atlantic region is extant, parrots on islands and lands are also depicted in exactly the same manner as on the map of 1513. The lands depicted with parrots on this later map, however, include Florida, Yucatan, Central America, and South America. This seems to cast doubt upon Kahle's "Parrot Theory." Two historians of cartography, Edward Heawood and Roberto Almagià, also expressed doubt in Kahle's theory in their reviews of his writings on this map.[82]

It should be noted that at least one other near-contemporary map depicts parrots perched on what appear to be two nonexistent islands in the Indian Ocean. This is the Spanish chart of 1522 in the Biblioteca Reale in Turin. We do not know the significance of the parrots on some of the islands of the Piri Reis map, but it seems clear that it is not for the reasons given by Kahle.

11 *Conclusions*

In the preceding analysis, it has been demonstrated that the Piri Reis map of 1513 exhibits many features in common with other surviving portolan charts and extended portolan-style maps of the fifteenth and sixteenth centuries and fits well into the evolution of mapmaking from the late Middle Ages to the early Renaissance. It resembles the contemporary Portuguese maps of Francisco Rodrigues, especially the delineations of the west coast of Africa, the east coast of South America, and the island of San Mateo, as well as the inscription which suggests that the castle at Elmina or a Portuguese padrão was depicted on the missing coast of Africa. A Portuguese map was also the apparent source for the land connection between South America and the Southern Continent, similarly shown on the Lopo Homem world map and

implied on the Reinel maps. All of these features confirm Piri Reis's statements that he used Portuguese maps as sources for making his world map.

Although there are features on the Piri Reis map which at first appeared to be unusual, such as the connection of Terra Australis to South America, the orientation of Hispaniola, and the depiction of Cuba as continental, these and other features of the map are not unexpected on a map of the early sixteenth century. Even the distortion and reduction of the east-west breadth of the Caribbean is not unusual: the Arabic Haji Abu al-Hasan chart, contemporary with Piri Reis, severely distorts the coast of Scandinavia and the south coast of Africa so that they will fit onto the vellum of the chart.[1] Similarly, Cuba on the Zorzi maplets is omitted because of insufficient room in the margins of the manuscript.[2]

Several place-names, some of which are easily identifiable, apparently have "migrated" from the feature to which the name was originally applied to an adjacent feature (see figs. 28, 29, and 30). Some of these "nomad" place-names are *Palme* and *Ile Fero* (i.e., Palma and Ferro, which have traded positions), *Dösiyta* (from Dèsirade northward to the approximate position of St. Kitts), *Galanda* (from Marie-Galante to the approximate position of St. Eustatius), *Samocristi* (from either St. Croix or St. Kitts to the approximate position of St. Eustatius), *Paksin vidad* (from the north coast of Hispaniola to the south coast), *Birbiniş* (from Alta Vela to the position of Isla Catalina or Isla Saona), and *Santa maria* (from near the south coast of Cuba to Alta Vela). Although it was not unusual for place-names to be relocated when copying from one map to another, there do seem to be an unusual number on the Piri Reis map that were misplaced. This may have been the fault of the professional calligrapher used by Piri Reis, or it may have been due to Piri Reis himself. It appears also that in compiling multiple maps into one, the place-names on the source maps were sometimes translated and in other cases transliterated.[3] This may be due to Piri Reis or the calligrapher not being totally familiar with the languages of the source maps, e.g., Spanish, Portuguese, Italian, etc.

We have also seen that Piri Reis offered a few particularly strange and incorrect guesses as to the origin of some place-names, such as *Ovosano* (Oceano) from ovo sano and *Izle de Vaka* (Y. Salvaga?) from Isla de Vaca. In the *Bahriye*, he offered many etymologies for Mediterranean place-names.[4] It also appears he misread some of the place-names on his source maps, such as mistaking Castella y Beragua for Castella Barrueco, i.e., Castle Pearl, and therefore writing *Qal'at feridat*, and mistaking a map notation, "Esta en Asia," i.e., "This is in Asia," for a place-name, *Istonasia*. The name for Hispaniola, *Elcezire Izle despanya*, is a hybrid of Turkish (or Arabic) and Spanish words and place-names. Although his translation of Alto Velo ("high veil" or "tall sail") as *Birbiniş*, i.e.,

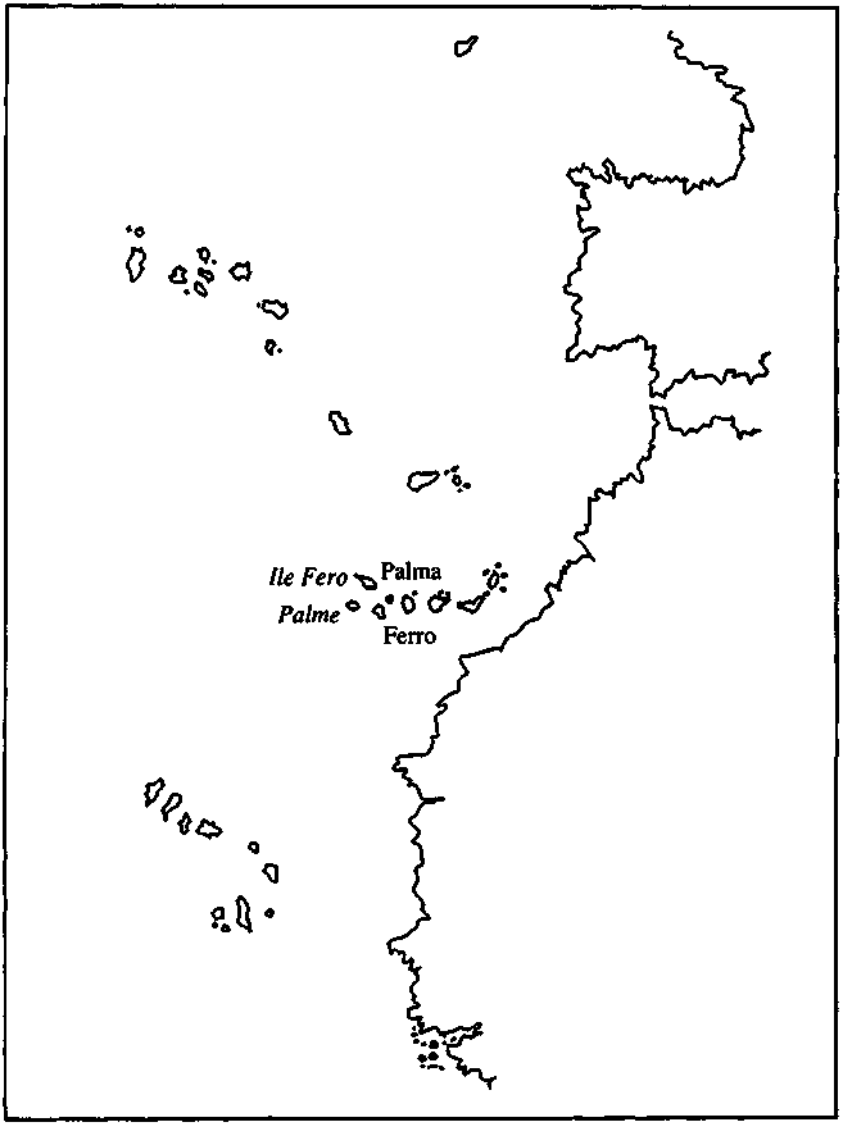


Figure 28. Possible misplaced place-names in the Atlantic Ocean on the Piri Reis map and their suggested correct locations.

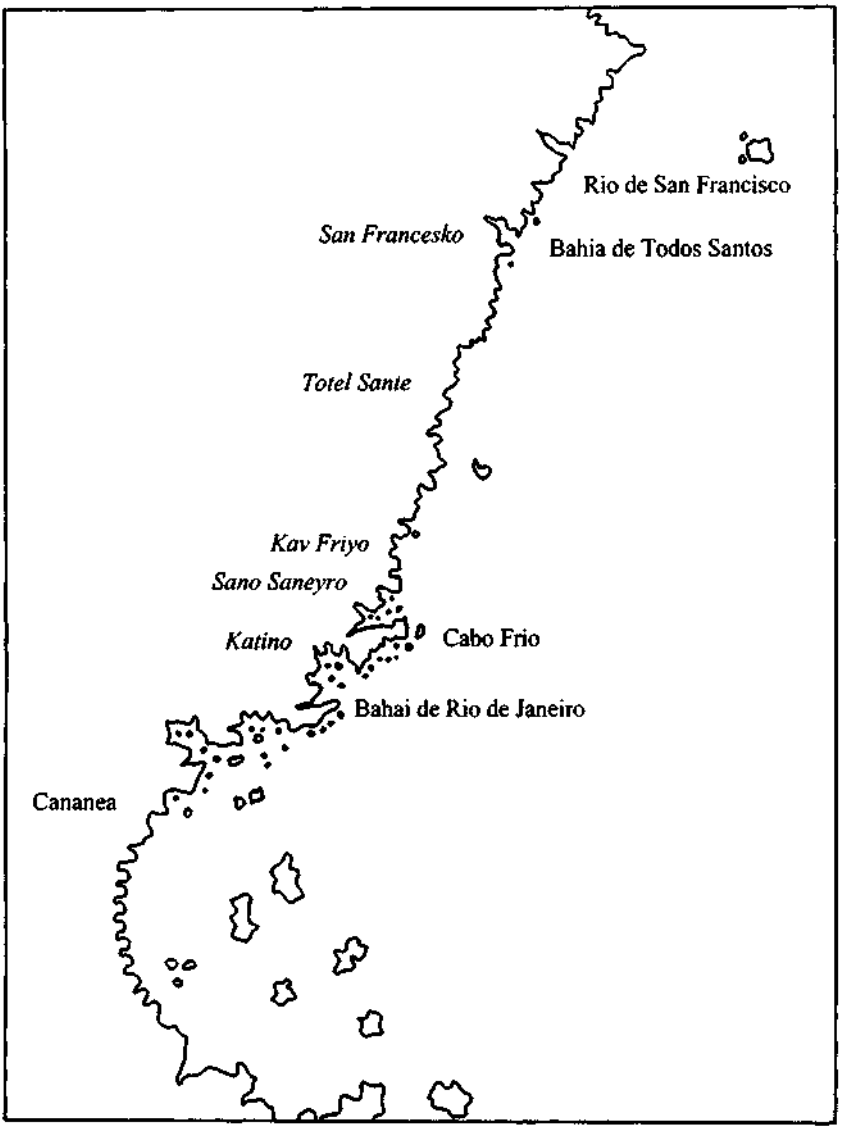


Figure 29. Possible misplaced place-names in South America on the Piri Reis map and their suggested correct locations.

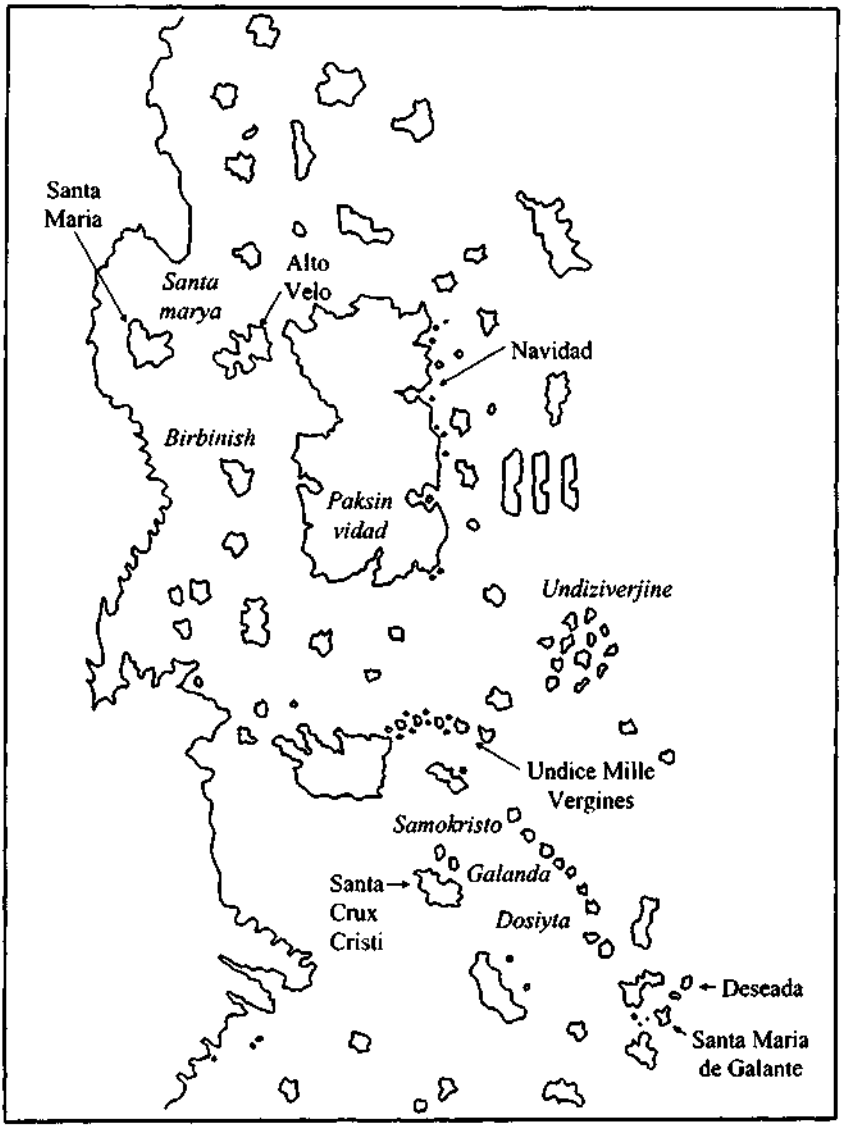


Figure 30. Possible misplaced place-names in the Caribbean on the Piri Reis map and their suggested correct locations.

bir biniş ("long cloak") is close, it is not exact. None of this inspires confidence in Piri Reis's supposed linguistic abilities.[5]

As we have seen, Kahle, the map's first and most influential researcher and commentator, also had problems transliterating and identifying some of its place-names. He incorrectly transliterated *Barbura* as "Barbuda," *Paksin vidad* as "San Domingo," and *Bazi dökünti* as "Bas Bakosa."[6] Most significantly, however, in regards to Kahle's dating of the Columbian source map, was his incorrect identification of *Kalewot* as Guadeloupe.

In figs. 31, 32, and 33 are given the modern identifications of some of the features on the Piri Reis map. Those followed by a question mark are tentative or speculative.

Some features have their first known cartographic expression on the Piri Reis map. These include the place-names of the legendary island of San Mateus or St. Matthew's Island (*Sanmetiyos*), Rio de Janeiro (*San Sanero*), Sier and Violas (*Sare* and *Viyole*), Babueca or Babura (*Barbura*), and possibly Anegada (*Kawad*?). Some place-names closely associated with Columbus have their *only* known cartographic representation on this map, e.g., Ornofay (*Orofay*) and Puerto Grande (*Punta ghande*). These two place-names, *Orofay* and *Porta ghande*, from Columbus's second voyage, are located on a depiction of the Columbian conception of Cuba as a mainland and point directly to the Columbian origin of the source map used by Piri Reis in compiling the depiction for this region of the Caribbean.

Although Ptolemaic maps preceded the Piri Reis map in depicting land to the south of Africa, they showed a landlocked Indian Ocean, and the northern littoral of the land that connected Africa to Asia was at about 15° S latitude. Maps with a southern continent preceded the Piri Reis map, such as the map by Beatus of Liébana of the late ninth or early tenth century and those based on the ancient ideas of Macrobius, such as the maps printed in northern Italy from 1483 through the sixteenth century. In the cartography of the Age of Discoveries and of the Renaissance, the Piri Reis map of 1513 is one of the earliest to depict the Southern Continent, preceded only by the world maps of Rosselli of c. 1508.[7] The depiction of the land connection between South America and Terra Australis, or the Southern Continent, is the earliest shown on a map and occurs on only two other slightly later maps—one Portuguese (Homem) and one Spanish (Vespucci). The depiction of the land connection between Cuba and Central America shown on the Piri Reis map, originally conjectured by Columbus, is preceded only by the Waldseemüller world map of 1507 (wherein Cuba is duplicated as the continental land of the Lusitano-Germanic maps).

Many commentators, particularly Kahle and Hapgood, in order to identify

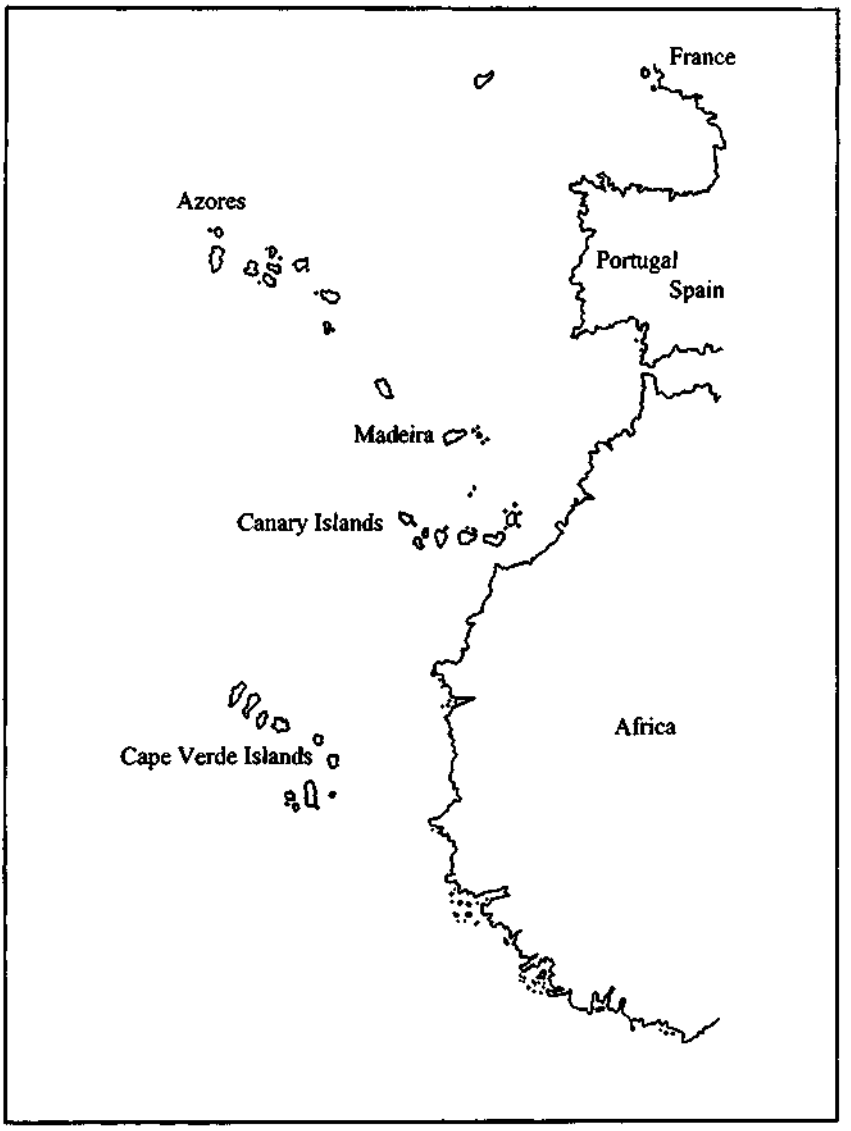


Figure 31. Modern identifications of features in Europe, Africa, and the Atlantic Ocean on the Piri Reis map.

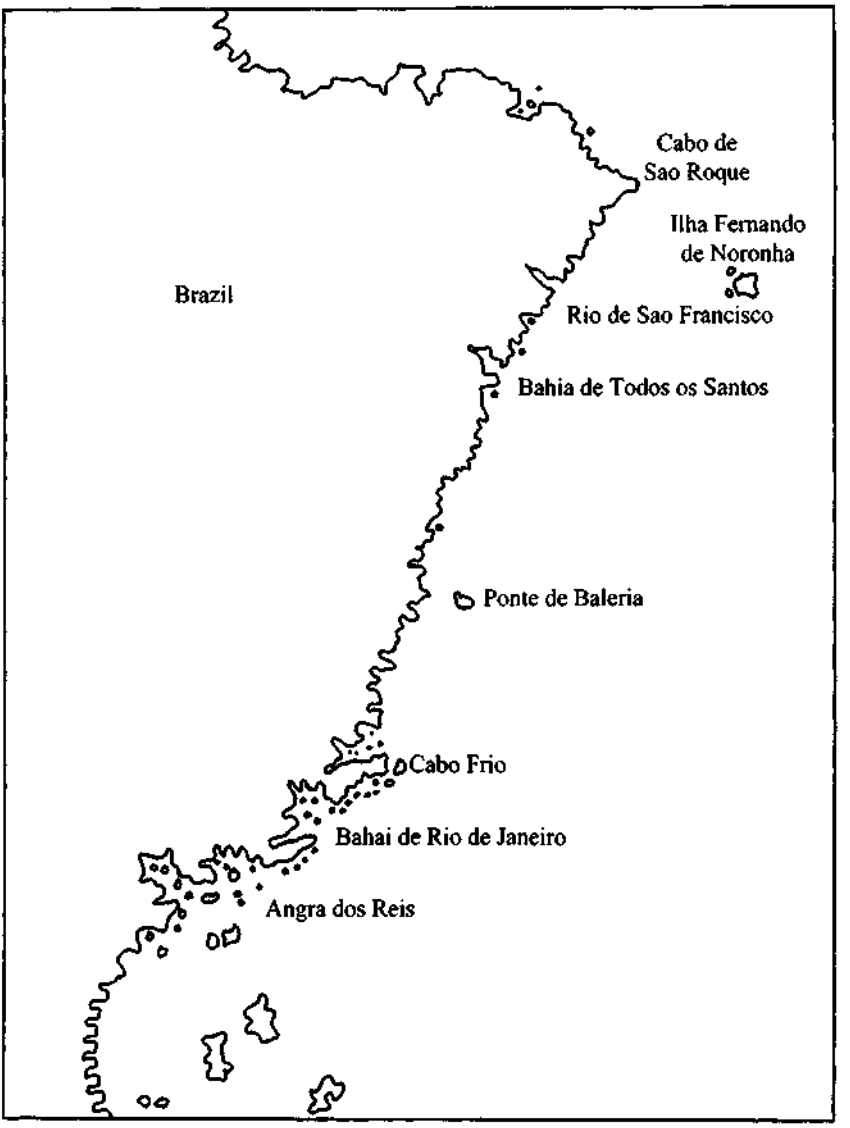


Figure 32. Modern identifications of features in South America on the Piri Reis map.

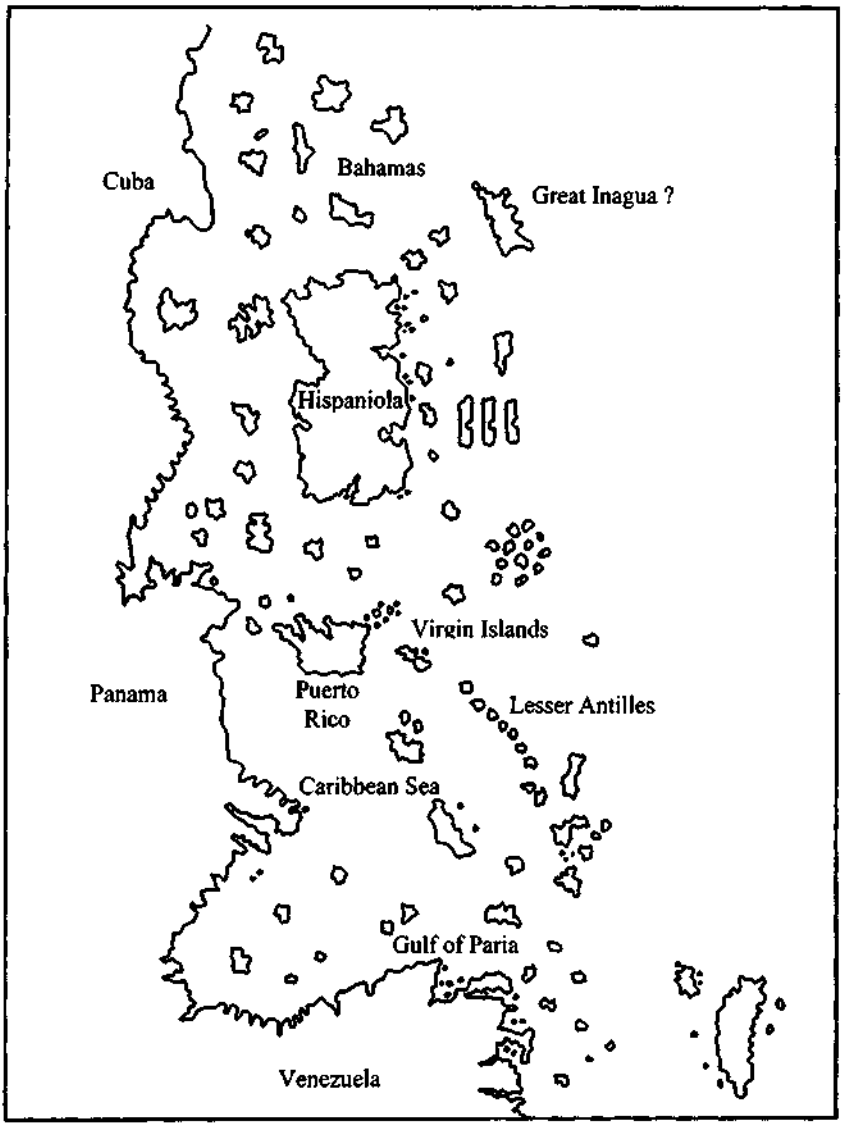


Figure 33. Modern identifications of features in the Caribbean on the Piri Reis map.

the coastal features of South America on the Piri Reis map, compared those delineations with a modern map without consulting manuscript maps contemporary with the Piri Reis map in the process. As we have seen, this is an incomplete method of analysis that resulted in errors and misidentifications.[8]

We have seen that Arlington Mallery overstated the resemblance of the coastline of the Southern Continent on the Piri Reis map to the coastline of Antarctica. This supposed resemblance was further developed by Charles Hapgood into the theory that the apparent inaccuracies of delineations and the representation of geographical theories of medieval and Renaissance maps indicated that a worldwide pre–Ice Age civilization had mapped the earth's surface. Later, Pauwels and Bergier and von Däniken, uncritically accepting the supposed resemblance between the Southern Continent on the Piri Reis map and the actual coastline of Antarctica, postulated a survey by extraterrestrials. Superficial resemblances of coastlines on old maps to actual coastlines are not a reliable source of information, however, particularly if place-names and inscriptions are ignored and comparison with other contemporary maps is omitted.[9]

The most significant aspect of the map is its connection with Christopher Columbus. Yet all the claims regarding this Columbian connection have been based on the reasoning and conclusions of Paul Kahle, the first scholar to study the map. Kahle concluded that all of the islands of the Caribbean region and the "Cuban mainland" were from Columbus's map of 1498.

We will now examine those points brought out earlier during the analysis of the Caribbean depictions on the Piri Reis map which demonstrate these erroneous conclusions regarding the dating of the Columbian source map and identify what on the Piri Reis map owe their depictions to a Columbian source map.

Kahle's primary conclusion is that Piri Reis used a map from Columbus's third voyage, dated 1498. This has been repeated by almost all subsequent scholars.[10] This claim for a 1498 date is based on five conclusions Kahle had arrived at regarding several features of the Piri Reis map. Each of Kahle's conclusions, his bases for accepting them, and the reasons for their being doubtful or invalid can be summarized as follows:

1. The Spanish prisoner from whom it is presumed the Columbus map was obtained in 1501 said he had sailed three times to the new lands in the west with Columbus, so Kahle concluded that the map was from the recently completed third voyage. Although it is probably a reasonable assumption that Kemal Reis did capture the prisoner and map in 1501 between the third and fourth voyages, it does not follow that the map was the latest version of Columbus's conception of the new lands and may have indicated only Columbus's explorations and geographical theories up to the end of the second voyage.

Further, it is questionable whether the Spanish sailor had been on three voyages with Columbus. He may have been bragging, as other Spanish sailors of his time did. After Columbus's triumphant return to Spain in 1493, it was not unusual for Spanish sailors who had not sailed with Columbus on his first voyage to have claimed that they had, as can be seen from the testimony of witnesses in the *Pleitos*. From the many incorrect statements made by the Spanish prisoner, as recorded in inscription no. 5, regarding Columbus's first voyage, it is apparent that this sailor was not a participant. Hence, it is not necessarily true that the Columbus source map obtained from the Spanish prisoner would have to be from the third voyage.

2. Kahle asserted that the portion of South America Columbus saw in 1498 on his third voyage is depicted on the map as islands. It is, however, obvious that South America is depicted as a continent in a configuration that is easily recognizable as South America and, as we have seen, is the same as on other maps of the first quarter of the sixteenth century. Apparently, what Kahle had in mind are the islands depicted at the southern end of the Lesser Antilles between the representation of the island of Dominica and the continent of South America. Kahle believed that these islands represented what Columbus mistakenly took to be islands but were in fact the headlands of the South American continent at the mouths of the Orinoco and the Gulf of Paria. Columbus first believed on 1 August 1498 that the points of land he was viewing were islands. By 11 August, however, he had decided that this new land he had been sailing along was continental, not islands.

Kahle, however, would have us believe that Columbus continued to show on his map a few islands where Columbus knew there was a continental mainland. The map that Columbus made at this time and sent back to Spain was not of islands but of the mainland around the Gulf of Paria. This was the map used by Hojeda, La Cosa, Niño, Bastidas, and others for their voyages to and explorations of a continental land.[11] Kahle apparently was not aware of the contradiction implied in his assertion that Columbus continued to show islands on his third voyage map when the map Columbus made and others used was of a mainland.

3. Kahle asserted that the *only* map known to have been made by Columbus was that made in 1498 during his third voyage,[12] and therefore it could only be the 1498 Columbus map that Piri Reis used. This can be swiftly dismissed, however, because it is well known from the records of the time and from our knowledge of the life of Columbus that he made many maps that depicted the new lands. Harrisse, in his study of early voyages and maps, lists at least eight maps Columbus made between 1492 and 1506.[13] Kahle's reasoning is groundless. It is not necessarily true that if the Piri Reis map incorporates a Columbus

map that the map must be that one Columbus made in 1498. Kahle was mistaken in asserting that Columbus made only one map.

Kahle reasoned that because a Columbian map was probably captured in 1501 by Kemal Reis and Piri Reis from a Spanish ship recently returning from the New World, and that the "only" map Columbus is known to have sent from the New World to Spain ahead of his return was a map showing the new lands discovered on the third voyage, it must be this third voyage map that Piri Reis used. This argument is not very strong, because the third voyage map that Columbus sent to Spain, which was used by Hojeda, La Cosa, Niño, Bastidas, and others in their voyages of 1499–1502, was sent on 18 October 1498, three years before the Turkish admirals obtained the map.

4. The reasoning that Kahle perhaps relied most upon to show that the Columbus source map was to be dated 1498 was what he claimed to be the island of Trinidad on the Piri Reis map. As we have seen, Kahle misidentified the Carib place-name *Kalewot*, i.e., Kalucaera (Guadeloupe), as the modern and anachronistic place-name Galeota on Trinidad. Kahle made much of this identification, relying heavily on it to substantiate his incorrect dating of 1498 for the Columbus source map.[14]

5. A final reason given by Kahle for concluding that the Columbian source map was from 1498 is Kahle's claim that the city of Santo Domingo is named on Hispaniola on the Piri Reis map and that this city was founded in 1497–98 after the abandonment of Isabela, the second settlement. There are two errors in this line of reasoning.

First, although Kahle admits that the pertinent place-name is partially effaced and nearly illegible, he feels confident enough of his reading to assert that it is Santo Domingo. The place-name has since been correctly read as *Paksin vidad*[15] or *Paksin vidada*.[16] As we have seen, this is Navidad, the first Spanish settlement. Apparently, Kahle could make out the Turkish word *pak*, meaning "clean," "pure," and therefore "holy," and supposed it to be a translation of *santo*, Spanish for "holy," and hence his identification of the toponym as Santo Domingo.

The second error is that, although it is true that the city was founded in 1497–98, it was originally named Nueva Isabela. It was not renamed Santo Domingo until 1502. If the place-name Santo Domingo was on the island of Hispaniola on the Piri Reis map, as Kahle claimed, it would have invalidated his claim for a 1498 date anyway.

There are other features of the Caribbean section of the Piri Reis map, which Kahle claimed Piri Reis copied from a Columbus source map of 1498, that may have their origin in events that occurred after 1498. The toponyms *Kawaw* (Anegada?) and *Dösiyta* (Deseada) in the Lesser Antilles may possibly be post-

1498. The fact that the Virgin Islands are shown twice on what Kahle asserted to be that portion of the Piri Reis map which was copied from the Columbus source map surely causes one to feel certain, instead, that two maps were conjoined and brings doubt as to whether Kahle has correctly identified the Columbian portion of Piri Reis's map. Most important, however, for demonstrating that not all of the Caribbean section is of before 1498, that is, that a major section of the Caribbean is from after 1498, is the identification of *Qal'at feridat* as Veragua, a toponym derived in 1504 during Columbus's fourth voyage.

For all of the reasons given, and most particularly the demonstration that *Qal'at feridat* is Castillo Beragua (or Castella y Veragua) and that *Kalewot* is not Trinidad, one must reject the claims that the Columbian source map is to be dated to 1498 and that the Columbian source map included that region south of Puerto Rico.

Everything from Puerto Rico southward was probably not part of the source map upon which Hispaniola, the Bahamas, and Cuba were based. If this were so, then this source map would have contained duplicated Virgin Islands, and it is not likely that the Virgin Islands would be shown twice on a map by Columbus. It is more likely that the duplicated Virgin Islands are a result of the process of combining and joining several maps together, as Piri Reis states he did in inscription no. 6. All the islands, lands, and place-names shown to the north of Puerto Rico on the map are of between 1492 and 1496, that is, before the third voyage of 1498, and there are depictions south of Puerto Rico that are later than 1498. There is not a single place-name or feature north of Puerto Rico on the Piri Reis map that is post-1494. There are features and place-names to the south of Puerto Rico on the map that are definitely post-1498, such as *Qal'at feridat,* i.e., Castella Veragua, and, of course, all those in South America and others that may be post-1498, such as *Dösiyta* (Deseada) and *Kawad* (Anegada?). The Caribbean region on the Piri Reis map is not from a single Columbian source map of 1498, as Kahle believed. It contains information copied from at least one map drawn after 1504 and possibly other maps as well.

One indication that these northern depictions are pre-1498 is that Hispaniola is still shown with the north-south orientation of Cipango. Presumably, Columbus would have corrected his image or understanding of the orientation of Hispaniola after the fall of 1498 following his traverse of the Caribbean Sea from Venezuela to Hispaniola. Presumably, by 1504 Columbus also would have discontinued a cartographic depiction of Hispaniola with a Cipango orientation.

The continuity of land joining Cuba (*Orofay,* i.e., Ornofay) to Panama (*Qal'at feridat,* i.e., Veragua) conforms to Columbus's geographical conceptions following his coasting of Central America in 1502–3. On this basis, it is

arguable that all of the depictions of the Caribbean, from the north coast of South America northward to include the Lesser Antilles, the Virgin Islands, Puerto Rico, Hispaniola, the Bahamas, Cuba, and Central America, are derived from a single map drawn after 1504. It is not likely, however, that this hypothetical single source map would be a Columbus map because, as we have seen, the Columbus source map used by Piri Reis was probably obtained in 1501.

There are, however, reasons for discounting this single map possibility. First, if this hypothetical single source Columbian map was drawn after 1504, as indicated by the Central American toponym *Qal'at feridat,* i.e., Castella Veragua, then it would be expected that as a Spanish-made map, it should depict and name the Windward Islands, discovered and named by Vicente Yáñez Pinzón in the spring of 1500 and clearly shown on the Juan de la Cosa map drawn later that same year.[17]

Second, the duplicated Virgin Islands, rather than supporting this hypothesis for a single source Columbian map for the Caribbean, instead strongly indicates that Piri Reis used at least two source maps for the depiction of this region, leading to the Virgin Islands inadvertently being shown twice. Also, the Virgin Islands lie on the preferred sailing route from Spain to Hispaniola, the center of Spanish operations in the Caribbean for the sixteenth century.[18] This route, pioneered by Columbus on his second voyage, is from Spain to Deseada and Dominica, then to Santo Domingo in Hispaniola via the Lesser Antilles. As such, it is unlikely that a Spanish (Columbian) map would depict an additional Virgin Island group.

Third, the delineations north of *Qal'at feridat* (Castella Veragua), that is, of Cuba, Hispaniola, and the Bahamas, give no indications of being from as late as 1504, or even 1498, and instead depict Columbus's geographical conceptions of c. 1495–96. The dislocation of Hispaniola and the Bahamas on the Piri Reis map to the north of Puerto Rico also strongly indicates that the delineations north of Puerto Rico were copied from a map different from the one used as the source for the delineation of Puerto Rico and the Lesser Antilles.

These three reasons suggest that the delineations of the Caribbean on the Piri Reis map north of *Qal'at feridat* and the duplicated Virgin Islands are from the Columbian source map mentioned by Piri Reis in inscriptions 5 and 6 on the map and in the prologue of the 1526 recension of the *Kitab-i Bahriye.*[19] Further, these same three reasons suggest that this Columbian source map is to be dated after Columbus's return to Isabela on 29 September 1494 following his circumnavigation of Hispaniola during his second voyage but before his arrival in Nueva Isabela (later Santo Domingo) on 31 August 1498.

It is recorded that Columbus had maps made during his second voyage in 1494, and copies may have been taken to Spain by Alonso de Torres in April

1495 or by Columbus when he returned to Europe in 1496.[20] Certainly, one of these second voyage maps made by Columbus or under his direction was the source for the Columbian depictions of Hispaniola, the Bahamas, and Cuba on the Piri Reis map.

What appeared to be a confused jumble in the northwest section of the map has been shown to conform to the geographical ideas of Columbus. The orientation of Hispaniola (Columbus's Cipango), although conforming to the then generally held opinion about Cipango, is incorrect. Could this be due to Columbus? For one thing, there were still strong medieval tendencies in the times, and the adherence to tradition and authority over experience was very strong. The cartography and geography of this time are replete with examples of wrong ideas persisting in the face of practical knowledge. For example, Scotland is shown on fifteenth-century and some sixteenth-century Ptolemaic maps "bent over" ninety degrees into an east-west axis.[21] In fact, much of Columbus's argument for the "Enterprise of the Indies" was based on tradition and authority (Aristotle, Averroës, Seneca, Strabo, Mandeville, Marinus of Tyre, the Old Testament, etc.). His acceptance of tradition and authority continued to color his interpretation of his experiences.

Until his death in 1506, Columbus continued to seek proofs that Hispaniola was Cipango (Japan), that Cuba was Mangi (China), and that he had discovered a new route to the Indies. Other than that was to have failed. For Columbus in 1495–96, when the map was made that Piri Reis was to later use, to have turned Hispaniola 90° to its correct position was to admit it was not Cipango and that his "Enterprise of the Indies" was a failure. Columbus is known for his tenacity, hardheadedness, and obstinacy when it came to his ideas.

Perhaps Columbus constructed two sorts of maps—"official" maps depicting the new lands in Asian configurations and "unofficial" maps, more accurate and more reliable, to be used for navigation. If so, the Columbus source map used by Piri Reis would have been an "official" map. The Columbian source map thus contained Columbus's intentional distortion (conscious or unconscious) of geography in order to show that he had reached Cipango and the mainland of Asia.

A tendency toward secrecy is a known characteristic of Columbus's personality, noted by many commentators. For instance, it appears Columbus may have kept secret the exact route to the "Asian mainland," that is, Central America, during the fourth voyage. He states in the *Lettera Rarissima* of 7 July 1503 that "no one can give an accurate account of where I went or came. . . . No one could tell under what part of the heavens we were. . . . Let them [i.e., the other pilots on the voyage] answer and say if they know where Veragua is situated. . . . They do not know the way to return . . . [and] they would be

obliged to go on a voyage of discovery as much as if they had never been there before."[22] If Columbus had constructed "official" maps that depicted the American lands in Asian configurations similar to the Toscanelli-Martellus-Rosselli-Behaim conception, then these "official" maps would have been useless for navigation and only the "unofficial" maps constructed by dead reckoning and by compass and chart would have been of practical value.

Nearing the end of his return from Cuba to Hispaniola during the second voyage, after months of sailing without proper food or adequate sleep, Columbus fell gravely ill. The symptoms suggest a nervous breakdown. He developed a high fever and a deep lethargy resembling a coma. He lost his eyesight, memory, and other faculties, and after returning to the settlement of Isabela at the end of September 1494, he lay ill for more than five months.[23] It may have been soon after this time, i.e., between early 1495 and early 1496 (when Columbus returned to Spain), that he made the map that was later used by Piri Reis.

It is difficult to accept the fact that Columbus, perhaps the greatest navigator of his time, would contort the orientations of Cuba and Hispaniola as much as 90° out of place. Yet this may be what happened. Although there is plenty of evidence of his navigational skills, there is also evidence of his shortcomings as a geographer, particularly evident during the third voyage to the Gulf of Paria region of Venezuela. At this time he refused to accept the statements of the experienced sailors with him that the headlands they were viewing were not islands but the alluvial plains and delta of a great river (the Orinoco). It was on this voyage also that he asserted that the earth was pear-shaped and the region of Venezuela was like a woman's breast that reached closer to Heaven than the rest of the globe. He believed the Terrestrial Paradise, i.e., the Garden of Eden, was located here, like a nipple on a breast.[24]

Columbus was known to be inordinately stubborn. For example, he always contended that Isabela, the second city he had founded in Hispaniola, was at the best location possible, although it had to be abandoned after only three years because of its poor facilities.[25]

As a further indication of Columbus's shortcomings as a geographer, on two separate occasions he failed to recognize the island of Hispaniola. The first time was during the second voyage when Columbus crossed the Mona Passage from Puerto Rico to the eastern end of Hispaniola. He refused to believe his native guides that the island was Hispaniola, where he had spent five weeks during the first voyage.[26] On the second voyage, when returning from Jamaica, he again failed to recognize Hispaniola and sailed along it for three days before he finally realized where he was.[27] On another occasion, during the third voyage, after crossing the Caribbean from Venezuela to Hispaniola, he arrived at the island of Beata off the south coast of Hispaniola, yet thought he was at the

island of Santa Caterina, 160 miles to the east.[28] He had first visited both of these islands on the second voyage while returning from Cuba to Hispaniola. And again, on the fourth voyage, Columbus seems to have been unable to recognize an island—Cayo Largo on the south shore of Cuba—he had visited on the second voyage.[29]

There are diagnostic features of the Piri Reis map, many of them unique to this map, that support the statements by Piri Reis that he copied a map by Columbus. The place-names on the map that exhibit a particular and significant connection to Columbus are *Elcezire Izle despanya* (Isla de Espania), *Paksin vidad* (Navidad), *Porta ghande* (Puerto Grande), *Orofay* (Ornofay), the island of *Santa marya* off the coast of Cuba, *Istonasia* (Esta en Asia), *Birbiniş* (Alta Vela), and *Barbura* (Babueca). The depictions on the map that evince a noteworthy and special association to Columbus are that of Hispaniola as Cipango and Cuba as a wedge-shaped mainland with a coast that extends north from a great cape and another coast that trends west and then curves south from this same cape. This Columbian notion of "Cuba-as-mainland" is also reflected on the Cantino map and other maps of the Lusitano-Germanic tradition. And *Qal'at feridat* (Veragua) in Central America, the displacement of Hispaniola, Cuba, and the Bahamas, and the double Virgin Islands mark the boundary between at least two source maps used by Piri Reis—post-1504 Portuguese and Italian maps to the south of the boundary and a Columbus map of c. 1495–96 to the north (see fig. 26).

The post-1504 map used by Piri Reis for his depiction of Central America and South America was very likely the same as that used by the maker of the Egerton MS 2803 map. The Piri Reis map and the Egerton map are the only maps to use the name *Antilia* for the continental mainland of the New World and are the only maps to use the name Castella Veragua (*Qal'at feridat*), including a picture of a castle, as a Central American toponym. Also, Santa Roque (Sao Roque) at the northeast corner of Brazil is named *Santalo ka* on the Piri Reis map, similar to "santique" for this same feature on the Egerton MS, fol. 9r map.

The place-names and depictions in the West Indies on the Piri Reis map indicate a strong connection to Columbus. There is also a certain strangeness about the delineations. It may be hard to see the direct connection to Columbus in this map. Yet when we add up all of the Columbian features on the Piri Reis map, i.e., the place-names and the Columbian geographical conceptions, there is an overwhelming preponderance of evidence that there is a Columbian map imbedded in the Piri Reis map, although one cannot say so categorically.

What historian Carl Ortwin Sauer said regarding the Columbian origin of the geography displayed on the Zorzi maplets could be equally applied to the

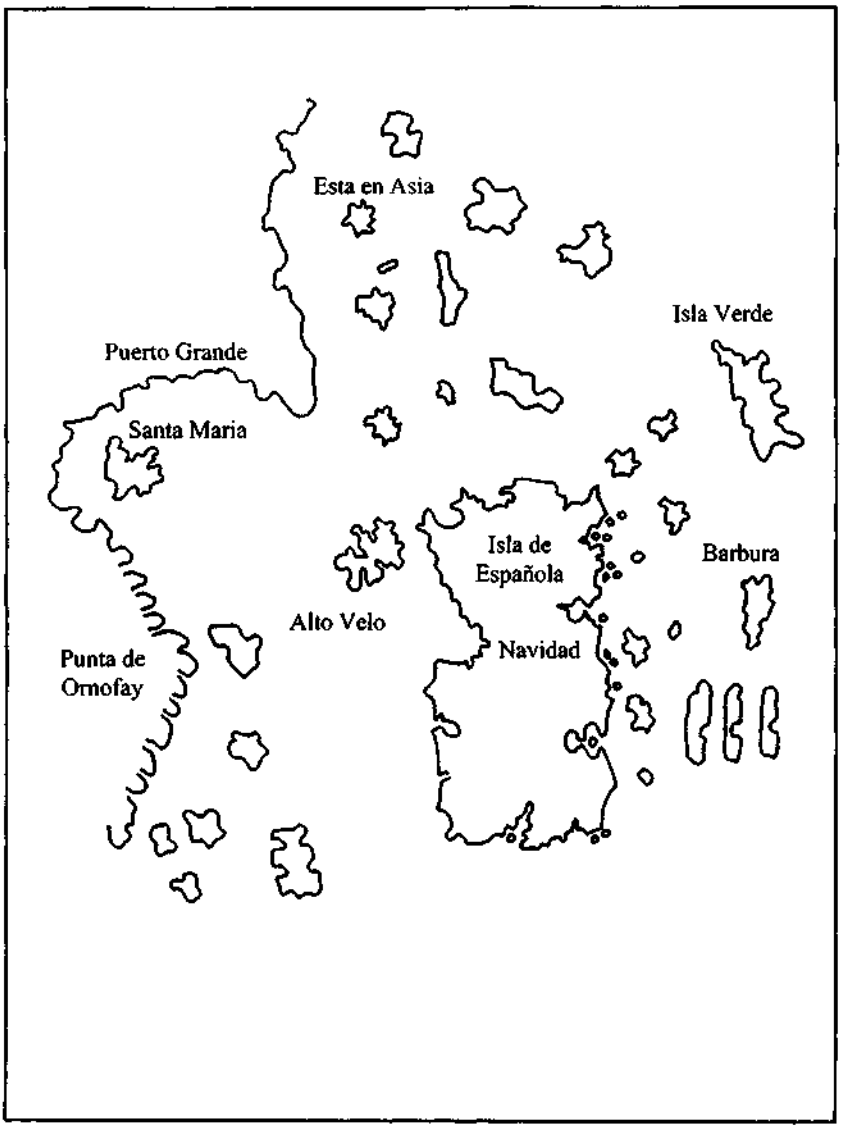


Figure 34. A suggested reconstruction of the Columbian source map of c. 1496.

depiction of Hispaniola, Cuba, and the Bahamas on the Piri Reis map: "The fantastic design of land and sea fits the ideas of Columbus. . . . A non- or post-Columbian map could hardly have been that bad."[30]

We might be tempted to attribute the Columbus source map used by Piri Reis to some other cartographer of the time, perhaps a shipmate of Columbus or someone who has taken the geography of the newly discovered lands of Columbus and attempted to combine them with the preconceived geography of East Asia. But who might this unknown cartographer be? When we look at the end of the fifteenth century and the beginning of the sixteenth century, there are only two men who fit this description—the Columbus brothers, Christopher and Bartolomew.

Figure 34 offers a possible reconstruction of the Columbian source map, made in c. 1495–96, and used by Piri Reis in compiling his depiction of the West Indies on his map. It is to be stressed, however, that this is a hypothetical reconstruction.

The most famous extant map of this period, the Juan de la Cosa map, is a copy probably made between 1501 and 1510 of the lost original of 1500.[31] It has been intensely studied since its discovery in 1832 and has frequently been declared to be the earliest cartographic record of the voyages of Columbus.[32] Yet the depiction of Cuba, Hispaniola, and the Bahamas on the Juan de la Cosa map is of no earlier than 1500. In fact, Juan de la Cosa bragged of how his knowledge of the new western lands was greater than that of anyone else, including Columbus.[33] Presumably, then, La Cosa held a very different geographical conception from that of Columbus. For instance, Cuba is shown as an island on La Cosa's map, whereas Columbus always maintained that Cuba was part of the mainland. The La Cosa map depicts Juan de la Cosa's geographical conceptions, not those of Columbus.

The Piri Reis map, however, displays the earliest, most primitive, and most rudimentary cartography of these islands, more primitive than even the celebrated Juan de la Cosa map,[34] a primitiveness which indicates that the earliest of all cartographic records of the discoveries in the New World—a map made by Christopher Columbus or under his supervision about 1495 or 1496—is preserved in the Piri Reis map of 1513.

APPENDIX A. *Maps Referenced in the Text*

The purpose of this list of maps is to give a description of the maps referred to in the text and to list available reproductions of them for the reader. Each entry contains the name of the author or the familiar designation of the map, region depicted (world or area), whether manuscript or printed, date of construction or publication, and a selection of reproductions to which the reader may refer. Those designated as "portolan chart" are manuscript and depict the Mediterranean and Atlantic. The maps are listed in chronological order. Whenever possible, the following recent standard cartographic references are cited: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica;* W. P. Cumming, R. A. Skelton, and D. B. Quinn, *The Discovery of North America* (New York: American Heritage Press, 1972); Fite and Freeman, *A Book of Old Maps;* Mollat du Jourdin and La Roncière, *Sea Charts of the Early Explorers, Thirteenth to Seventeenth Century;* Nebenzahl, *Atlas of Columbus and the Great Discoveries;* Portinaro and Knirsch, *The Cartography of North America;* Shirley, *The Mapping of the World: Early Printed World Maps, 1472–1700;* and Hans Wolff, ed., *America: Early Maps of the New World,* trans. Hugh Beyer, Joan Clough-Lamb, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag, 1992). Citations of maps illustrated in Shirley, *The Mapping of the World: Early Printed World Maps, 1472–1700,* are by "Shirley number," and most citations from Portinaro and Knirsch, *The Cartography of North America,* and Wroth, *The Voyages of Giovanni da Verrazzano, 1524–1528,* are by plate number. All other citations are by page number.

Ptolemy, Claudius [world, ms. and printed, c. 150 C.E.?; 13th century?; 15th century]
Reproduction: Campbell, *Earliest Printed Maps,* frontispiece, figs. 31–39; Fite and Freeman, *Old Maps,* xvi; J. B. Harley and David Woodward, eds., *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean,* vol. 1 of *The History of Cartography* (Chicago: University of Chicago Press, 1987), pl. 9; Rütiger Finsterwalder, "The Round Earth on a Flat Surface: World Projections before 1550," in *America: Early Maps of the New World,* ed. Hans Wolff, trans. Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian

Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag, 1992), 164; Mollat du Jourdin and La Roncière, *Sea Charts*, 21; Nebenzahl, *Columbus*, 4–5; Shirley nos. 3, 4, 5 and 10; Wolff, "Early Images," 22.

Carte Pisane [portolan chart, c. 1290]
Reproduction: Harley and Woodward, *Cartography*, pl. 30; Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 1.

Dulcert, Angelino [portolan chart, 1339]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 7.

Catalan Atlas [world, ms., probably by Abraham Cresques, c. 1380]
Reproduction: George Grosjean, ed., *The Catalan Atlas of the Year 1375* (Dietkon-Zurich: Urs Graf, 1978); Harley and Woodward, *Cartography*, pl. 17; Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 8; Nebenzahl, *Columbus*, 6–7.

Viladestes, Mecia de [portolan chart, 1413]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 12.

Pizzigano, Zuane [portolan chart, ms., 1424]
Reproduction: Cortesão, "North-Atlantic Chart of 1424," opp. p. 1; Cortesão, *Nautical Chart of 1424;* Cortesão, *History of Portuguese Cartography*, 2:126–27; Nebenzahl, *Columbus*, 9–11.

Beccario, Battista [portolan chart, 1426]
Reproduction: Babcock, *Legendary Islands*, fig. 3 opp. p. 45.

Beccario, Battista [portolan chart, 1435]
Reproduction: Babcock, *Legendary Islands*, 152 fig. 20.

Bianco, Andrea [portolan atlas, ms., world and regions, 1436]
Reproduction: Babcock, *Legendary Islands*, 179 fig. 25.

Leardo mappamundi [world, ms., 1452 or 1453]
Reproduction: Wright, *Leardo Map*, figs. 4–10.

Pareto [portolan chart, 1455]
Reproduction: Babcock, *Legendary Islands*, 158 fig. 21.

Genoese world map [world, ms., 1457]
Reproduction: Edward Luther Stevenson, *Genoese World Map, 1457: Facsimile with Critical Text,* publications of the Hispanic Society of America, no. 83 (New York: American Geographical Society and the Hispanic Society of America, 1912), frontis.; Peter Whitfield, *The Image of the World: Twenty Centuries of World Maps* (San Francisco: Pomegranate Artbooks, 1994), 40–41.

Benincasa, Grazioso [portolan chart, 1467]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 18.

Benincasa, Grazioso [portolan chart, 1468]
Reproduction: Garrett Mattingly, "Navigator to the Modern Age," *Horizon* 3 (November 1960): 79.

Benincasa, Grazioso [portolan chart, 1470]
Reproduction: Cumming, Skelton, and Quinn, *North America,* 40.

Toscanelli, Paolo dal Pozzo [world, ms., 1474 (1867, 1892, 1894)]
Reproduction: Carlos Malheiro Dias, Conselheiro Ernesto de Vasconcelos, and Roque Gameiro, *História da Colonização Portuguesa do Brasil,* 3 vols. (Oporto, Portugal: Litografia Nacional, 1921), 1:lxi, lxxxvi, lxxxvii; Hans Wolff, "The Conception of the World on the Eve of the Discovery of America—Introduction," in *America: Early Maps of the New World,* ed. Hans Wolff, trans. Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag, 1992), 15.

Benincasa, Grazioso [portolan chart, 1482]
Reproduction: Babcock, *Legendary Islands,* 160 fig. 22.

Macrobius [world, printed, 1483]
Reproduction: Campbell, *Earliest Printed Maps,* fig. 21; Portinaro and Knirsch, *North America,* 10; Shirley no. 13; Wolff, "Early Images," 16.

Ginea Portogalexe [portolan, by Cristofero Soligo, 1485]
Reproduction: Divine, *World,* 141.

Cornaro chart [portolan atlas, late fifteenth century]
Reproduction: Harley and Woodward, *Cartography,* pl. 23.

Paris map (or the "Christopher Columbus chart") [extended portolan, c. 1489–1500]
Reproduction: Fite and Freeman, *Old Maps*, 6–8; La Roncière, *Christophe Colomb;* Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 21; Nebenzahl, *Columbus*, 24–25; Taviani, *Columbus*, 74, 309–10; Wallis, "Paris Map," 21.

Yale-Martellus [world, ms., by Henricus Martellus, c. 1489]
Reproduction: Alexander O. Vietor, "Pre-Columbian Map," *Imago Mundi* 17 (1963): 94–96; Nebenzahl, *Columbus*, 15.

Martellus, Henricus [world, ms., c. 1489]
Reproduction: Nebenzahl, *Columbus*, 15–17; Portinaro and Knirsch, *North America*, 28–29; Shirley, *Printed World Maps*, xxiii, pl. 4; Wolff, "Conception," 14.

Cipango from *Insularium Illustratum* [ms., by Henricus Martellus, c. 1490]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 5:170.

Aguiar, Jorge de [portolan chart, 1492]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 6: pl. 1.

Behaim, Martin [world, ms., globe, 1492]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 20; Morison, *Admiral* (abridged), 66–67; Nordenskiöld, *Facsimile-Atlas*, 72; Wolff, "Early Images," 24–25.

Rosselli, Francesco [world, printed, c. 1492]
Reproduction: Campbell, *Earliest Printed Maps*, fig. 42.

Alba sketch-map [Hispaniola, ms., c. 1493 or later]
Reproduction: Uta Lindgren, "Trial and Error in the Mapping of America during the Early Modern Period," in *America: Early Maps of the New World*, ed. Hans Wolff, trans. Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag, 1992), 146; Nebenzahl, *Columbus*, 26.

La Cosa, Juan de [world, extended portolan, ms., c. 1500–1510]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 36; Fite and Freeman, *Old Maps*, 10–12; Mollat du Jourdin and La Roncière, *Sea Charts*,

pl. 22; Nebenzahl, *Columbus,* 30–33; Portinaro and Knirsch, *North America,* pl. 1; Shirley, *Printed World Maps,* xxiii, pl. 5; Wolff, "Early Images," 44–45; Wroth, *Verrazzano,* pls. 1 and 2.

Ferraro MS. [Hispaniola, sketch map, ms., c. 1502]
Reproduction: Guiseppe Ferraro, *Relazione delle scoperte fatte da C. Colombo, da A. Vespucci e da altri dal 1492 al 1506* (Bologna: Presso Gaetano Romagnoli, 1875), pl. 37.

Cantino [world, extended portolan, ms., 1502]
Reproduction: Cumming, Skelton, and Quinn, *North America,* 56–57; Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 25; Nebenzahl, *Columbus,* 34–37; Portinaro and Knirsch, *North America,* pl. 2; Wolff, "Early Images," 46–47; Wroth, *Verrazzano,* pl. 3.

King-Hamy-Huntington [world, extended portolan, ms., c. 1502–4]
Reproduction: Afetinan, *Piri Reis'in Amerika Haritasi,* 59; Afetinan, *Oldest Map,* 54; Afetinan, *Life and Works,* pl. 23 (fig. 26); Levillier, *América,* 2:8–9.

British Museum Additional MS 31316, folio 5 [North Atlantic, ms., c. 1502–4]
Reproduction: R. A. Skelton, "The Cartography of the Voyages," appendix in *The Cabot Voyages and Bristol Discovery under Henry VII* by James A. Williamson (Cambridge: Hakluyt Society, 1962), pl. 11 opp. p. 309.

Canerio (or Caveri), Nicolo (or Nicolay) [world, extended portolan, ms., c. 1502–5]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 26; Nebenzahl, *Columbus,* 40–43; Portinaro and Knirsch, *North America,* pl. 3; Stevenson, *Canerio,* frontis.; Wroth, *Verrazzano,* pl. 4.

Kunstmann no. 2 [world, extended portolan, ms., c. 1502–6?]
Reproduction: Levillier, *América,* 2:10, 11, 13; Hans Wolff, "The Munich Portolan Charts: Past and Present," in *America: Early Maps of the New World,* ed. Hans Wolff, trans. Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag, 1992), 135.

Kunstmann no. 3 [Atlantic Ocean, extended portolan, ms., c. 1502–6]
Reproduction: Levillier, *América,* 2:57; Wolff, "Portolan Charts," 136.

Anonymous–Pedro Reinel [Indian Ocean, ms., c. 1504]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 11.

Pesaro (Oliveriana) [world, extended portolan, ms., c. 1505–10]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 62; Dilke and Brancati, "Pesaro Map," 83; Frederick J. Pohl, "The Pesaro Map, 1505," *Imago Mundi* 7 (1950): fold-out map opp. p. 82.

Contarini-Rosselli [world, printed, 1506]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 54–55; Fite and Freeman, *Old Maps*, 18–20; Nebenzahl, *Columbus*, 44–47; Shirley no. 24.

Waldseemüller, Martin [world, globe gores, printed, 1507]
Reproduction: Nebenzahl, *Columbus*, 27; Shirley no. 27; Wolff, *America: Early Maps*, frontis.; Wroth, *Verrazzano*, pl. 8.

Waldseemüller, Martin [world, printed, 1507]
Reproduction: Fite and Freeman, *Old Maps*, 24–27; Nebenzahl, *Columbus*, 52–55; Portinaro and Knirsch, *North America*, pl. 4; Shirley no. 26; Wolff, "Waldseemüller," 114–15; Wroth, *Verrazzano*, pls. 6 and 7.

Ruysch, Johann [world, printed, 1507 and 1508]
Reproduction: Fite and Freeman, *Old Maps*, 28–31; Lindgren, "Trial and Error," 163; Nebenzahl, *Columbus*, 48–51; Shirley no. 25; Wroth, *Verrazzano*, pl. 9.

Rosselli, Francesco [world, printed, c. 1508]
Reproduction: Finsterwalder, "Round Earth," 171; Nebenzahl, *Columbus*, 56–57; Portinaro and Knirsch, *North America*, pl. 5; Shirley nos. 28, 29 and 67(A).

Egerton MS 2803, folio 1v [world, ms., c. 1508–13]
Reproduction: Babcock, *Legendary Islands*, fig. 8 opp. p. 74; Davies, "Egerton," opp. p. 47.

Egerton MS 2803, folios 7v-8r-9r [West Indies and South America, extended portolan, ms., c. 1508–13]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 61; Denucé, "South America," 128.

Lenox Globe [world, c. 1510–12]
Reproduction: Fite and Freeman, *Old Maps*, 22–23; Lindgren, "Trial and Error," 147; Nordenskiöld, *Facsimile-Atlas*, 75.

Reinel, Jorge [Indian Ocean, extended portolan, ms., c. 1510]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 9.

Martyr, Peter [West Indies, printed, probably by Andrés de Morales, 1511]
Reproduction: Nebenzahl, *Columbus*, 60–61; R. A. Skelton, *Explorers' Maps: Chapters in the Cartographic Record of Geographical Discoveries* (1958; reprint, London: Spring Books, 1970), 61, fig. 37; Wroth, *Verrazzano*, pl. 11.

Maggiolo (Maiolo), Vesconte [world, ms., 1511]
Reproduction: Nebenzahl, *Columbus*, 58–59; Wroth, *Verrazzano*, pl. 12.

Rodrigues, Francisco [west coast of Africa and Cape Verde Islands, ms., c. 1511–13]
Reproduction: Cortesão, *Francisco Rodrigues*, 1: pl. 34; Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 34, chart no. 7.

Rodrigues, Francisco [west coast of Africa between 8° N and 5° N, ms., c. 1511–13]
Reproduction: Cortesão, *Francisco Rodrigues*, 1: pl. 35; Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 34, chart no. 8.

Rodrigues, Francisco [coast of Brazil, ms., c. 1511–13]
Reproduction: Cortesão, *Francisco Rodrigues*, 1: pl. 36; Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 34, chart no. 9.

Rodrigues, Francisco [west coast of Africa between 5° N and 16° S, ms., c. 1511–13]
Reproduction: Cortesão, *Francisco Rodrigues*, 1: pl. 37; Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 34, chart no. 10.

Piri Reis [world, ms., fragment, 1513]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 28; Nebenzahl, *Columbus*, 62–63; Portinaro and Knirsch, *North America*, pl. 7; Wolff, "Early Images," 43.

Schöner Globe [world, by Johannes Schöner, 1515]
Reproduction: Lindgren, "Trial and Error," 147; Nordenskiöld, *Facsimile-Atlas,* 78–79; Wroth, *Verrazzano,* pl. 13.

Zorzi maplets [world, ms., c. 1516–22]
Reproduction: Fite and Freeman, *Old Maps,* 14–16; Nebenzahl, *Columbus,* 38–39.

Homem-Reinel ("Miller Atlas") [Moluccas, ms., c. 1519–21]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 1: pl. 20; Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 32; Nebenzahl, *Columbus,* 67, 70–71.

Homem-Reinel ("Miller Atlas") [Brazil and South Atlantic, ms., c. 1519–21]
Reproduction: Cortesão and Teixeira de Mota, *Portugaliae Monumenta Cartographica,* 1: pl. 22; Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 33.

Homem, Lopo ("Miller Atlas") [world, ms., c. 1519–21]
Reproduction: Cortesão and Teixeira de Mota, *Portugaliae Monumenta Cartographica,* 1: pl. 16; Heawood, "Undescribed Map," 159–60; Edward Heawood, "Lopo Homem's Map of 1519," *Geographical Journal* 77 (March 1931): 250–53.

Coppo, Pietro [atlas, ms., 1520]
Reproduction: Roberto Almagià, "The Atlas of Pietro Coppo, 1520," *Imago Mundi* 7 (1950): map opp. p. 49.

Schöner Globe [world, by Johannes Schöner, 1520]
Reproduction: Fite and Freeman, *Old Maps,* 32–34; Lindgren, "Trial and Error," 148; Portinaro and Knirsch, *North America,* pl. 8.

Kunstmann no. 1. [Atlantic, extended portolan, ms., by Pedro Reinel, c. 1521]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 1: pl. 8; Wolff, "Portolan Charts," 131; Wroth, *Verrazzano,* pl. 5.

Anonymous Spanish map in the Biblioteca Reale, Turin [Indian Ocean, ms., c. 1522]
Reproduction: Richard Humble, *The Explorers,* vol. 3 of *The Seafarers* (Alexandria, Va.: Time-Life Books, 1979), 163.

Turin [New World, ms., c. 1523]
Reproduction: Harrisse, *North America*, pl. 19.

Vespucci, Juan (Giovanni) [world, printed, 1524]
Reproduction: Finsterwalder, "Round Earth," 170; Harrisse, *North America*, pl. 10; Nebenzahl, *Columbus*, 77–79; Shirley no. 54.

Anonymous-Chatsworth [world, printed, fragment, c. 1525]
Reproduction: Shirley no. 55.

Salviati [world, extended portolan, ms., c. 1525, probably by Nuno García de Toreno]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 72; Portinaro and Knirsch, *North America*, pl. 11; Wolff, "Early Images," 48–49.

Castiglioni (or Mantua) [world, ms., by Diego Ribero (Diogo Ribeiro), c. 1525–27]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 74; Cortesão and Teixeira de Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 37; Wroth, *Verrazzano*, pl. 37.

Ambassador's Globe [world, c. 1525–33]
Reproduction: Wroth, *Verrazzano*, pls. 26 and 27.

Anonymous-Weimar (or Weimar–Spanish Ribero) [world, ms., probably by Diego Ribero (Diogo Ribeiro), c. 1527]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 38.

Monachus, Franciscus [world, printed, c. 1526–30]
Reproduction: Finsterwalder, "Round Earth," 168; Portinaro and Knirsch, *North America*, pl. 10; Shirley no. 57; Skelton, "First Voyage," fig. 9 following p. 226; Wroth, *Verrazzano*, pl. 23.

Piri Reis [North Atlantic, ms., fragment, 1528]
Reproduction: Afetinan, *Piri Reis'in Amerika Haritasi*, 47; Afetinan, *Oldest Map*, 42; Afetinan, *Life and Works*, pl. 58; Hapgood, *Sea-Kings*, 62 fig. 39; Mardin, "Piri Reis," 21; Tekeli, "Map of America," 682; Van de Waal, "Manuscript Maps," 90 fig. 1.

Ciampangu (Cipango) from *Isolario* [Japan, printed, by Benedetto Bordone, 1528]
Reproduction: Benedetto Bordone, *Libro di Benedetto Bordone nel Qual si ragiona de tutte l'Isole del mondo,* reprint of 1528 edition, with introduction by R. A. Skelton (Amsterdam: Theatrum Orbis Terrarum, 1966), 68r.

Spagnola from *Isolario* [Hispaniola, printed, by Benedetto Bordone, 1528]
Reproduction: Bordone, *L'Isole del mondo,* 12v; Cecil Jane, trans., *The Journal of Christopher Columbus,* reprint of 1930 edition, with additions, appendix "The Cartography of Columbus' First Voyage" by R. A. Skelton (New York: Bramhall House, 1960), 87.

Paris Gilt Globe (De Bure Globe) [world, globe, c. 1528]
Reproduction: Harrisse, *North America,* pl. 21 opp. p. 568; Wroth, *Verrazzano,* pl. 24.

Weimar-Ribero [world, ms., by Diego Ribero (Diogo Ribeiro), 1529]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 1: pl. 40.

Vatican (or Rome Ribero, Propaganda, or Borgian) [world, ms., by Diego Ribero (Diogo Ribeiro), 1529]
Reproduction: Cumming, Skelton, and Quinn, *North America,* 106–7; Fite and Freeman, *Old Maps,* 46–49 (misidentified as the Weimar-Ribero map described immediately above); Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 37; Nebenzahl, *Columbus,* 92–95; Portinaro and Knirsch, *North America,* pl. 12; Wolff, "Early Images," 52–53; Wroth, *Verrazzano,* pl. 38.

Dillingen [world, fragment, probably by Diego Ribero, c. 1530]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 5:5–6, pl. 523.

Fine, Oronce [world, printed, 1531]
Reproduction: Lindgren, "Trial and Error," 150; Shirley no. 66.

Wolfenbüttel B [world, probably by Diego Ribero, c. 1532]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 1: pl. 41.

Ramusio (or Summario) [Atlantic Ocean and Western Hemisphere, printed, 1534]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 71; Arthur Holzheimer and David Buisseret, *The "Ramusio" Map of 1534*, Hermon Dunlap Smith Center for the History of Cartography, Occasional Publication no. 6 (Chicago: Newberry Library, 1992), pl. 1, endpapers; Nebenzahl, *Columbus*, 96–97; Wroth, *Verrazzano*, pl. 39.

Fine, Oronce [world, printed, 1534]
Reproduction: Nordenskiöld, *Facsimile-Atlas*, 89; Portinaro and Knirsch, *North America*, pl. 15; Shirley no. 69; Wolff, "Early Images," 73.

Reinel, Jorge [South Atlantic, extended portolan, ms., c. 1534–40]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 15; J. Brian Harley, *Maps and the Columbian Encounter* (Milwaukee: Golda Meir Library, University of Wisconsin, 1990), 104.

Reinel, Pedro[?] [North Atlantic, extended portolan, ms., c. 1535]
Reproduction: Portinaro and Knirsch, *North America*, pl. 14; Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 14.

Anonymous German globe gores [world, printed, c. 1535]
Reproduction: Shirley no. 71.

Vopell Globe gores fragment [world, printed, by Caspar Vopell, 1536]
Reproduction: Shirley no. 73.

Mercator, Gerhard [world, printed, 1538]
Reproduction: Finsterwalder, "Round Earth," 167; Fite and Freeman, *Old Maps*, 54–56.

Münster, Sebastian [Western Hemisphere, printed, 1540]
Reproduction: John Goss, *The Mapping of North America: Three Centuries of Map-Making, 1500–1860* (Secaucus, N.J.: Wellfleet Press, 1990), 25; Nebenzahl, *Columbus*, 98–99; Wolff, "Early Images," 91.

Agnese, Battista [atlases, ms., c. 1542–50]
Reproduction: Nebenzahl, *Columbus*, 100–101; Portinaro and Knirsch, *North America*, pls. 21 and 22; Wolff, "Portolan Charts," 140–41; Wroth, *Verrazzano*, pls. 30 and 31.

Cabot, Sebastian [world, printed, 1544]
Reproduction: Fite and Freeman, *Old Maps*, 60–63; Nebenzahl, *Columbus*, 104–7; Shirley no. 81; Wolff, "Early Images," 75.

Gastaldi, Giacomo [world, printed, 1546]
Reproduction: Shirley no. 85; Stevens, "Asian-American Connection," 32 fig. 3; Wroth, *Verrazzano*, pl. 40.

Gastaldi, Giacomo [world, printed, 1548]
Reproduction: Portinaro and Knirsch, *North America*, pl. 26; Shirley no. 88; Wolff, "Early Images," 76.

Gutierrez, Diego [North Atlantic, ms., 1550]
Reproduction: Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 46.

al-Hasan, Haji Abu (Ebul Hasan) [portolan chart, mid-sixteenth century]
Konyali, *Topkapi Sarayinda*, pl. 2 opp. p. 130; Soucek, "Islamic Charting," 267 fig. 14.4; Van de Waal, "Manuscript Maps," 95 fig. 5.

Homem, Lopo [world, ms., 1554]
Reproduction: Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 27.

Le Testu, Guillaume [world, ms., 1555]
Reproduction: George, *Animals and Maps*, 176–78.

Vopell-Vavassore [world, printed, 1558]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 78; Shirley no. 102.

Gastaldi, Giacomo [world, printed, 1561]
Reproduction: Shirley no. 107.

Ruscelli, Girolamo [world, printed, 1561]
Reproduction: Shirley no. 111; Wolff, "Early Images," 77.

Forlani, Paolo [world, printed, 1565]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 144–45; Portinaro and Knirsch, *North America*, pl. 41; Shirley no. 115; Wolff, "Early Images," 79.

Ortelius, Abraham [world, printed, 1570]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 149; Lindgren, "Trial and Error," 158; Portinaro and Knirsch, *North America*, pl. 40 (misidentified as the Ortelius world map of 1564); Shirley no. 122; Wolff, "Early Images," 81.

Bry, Theodore de, and Jacques le Moyne [Florida, printed, 1591]
Reproduction: Cumming, Skelton, and Quinn, *North America*, 175; Goss, *North America*, 45.

Bry, Theodore de [Caribbean, printed, 1594]
Reproduction: Jonathan Potter, *The Country Life Book of Antique Maps* (Secaucus, N.J.: Chartwell Books, 1989), 164.

Wytfliet, Cornelius [Cuba, printed, 1597]
Reproduction: Nordenskiöld, *Facsimile-Atlas*, pl. 51; Justin Winsor, ed., *Narrative and Critical History of America*, 8 vols. (Boston: Houghton Mifflin, 1889), 2:230; Wolff, "Early Images," 100.

Hondius, Jodocus [Guiana, printed, 1598–99]
Reproduction: George, *Animals and Maps*, 72–73 fig. 3.6.

Bry, Theodore de [Guiana, printed, 1599]
Reproduction: Skelton, *Explorers' Maps*, 89 fig. 58.

Wright-Molyneux [world, printed, 1599]
Reproduction: Fite and Freeman, *Old Maps*, 100–102; Nebenzahl, *Columbus*, 156–59; Shirley no. 122.

This page intentionally left blank

APPENDIX B. *Cross-References of Inscription Numbers*

The numbering of the inscriptions in this study is based on that used by Akçura. Various transcriptions, transliterations, and translations of the inscriptions on the Piri Reis map have been made and published since the discovery of the map in 1929. Different numbers have been used for the inscriptions in these various publications. This has caused some confusion when subsequent writers have referred to an inscription number that is numbered differently by another writer.

The following table provides a cross-referenced listing of the inscription numbers used by the various authors cited. For clarity, the roman numerals used by these authors have been changed to arabic numerals. Because most historians cite the numbering system originally used by Akçura in 1935, the same numbering system for the inscriptions has been used for the present work. There are, however, some map inscriptions that were not numbered or translated by Akçura, and the numbering of the inscriptions has been extended to include those. In this table, a dash denotes an inscription overlooked or omitted by the pertinent author.

Note that Hapgood, *Maps of the Ancient Sea-Kings* (1966), using Afetinan, *Oldest Map of America* (1954), without the benefit of the key map from Akçura, *Piri Reis Haritasi* (1935; reprint, 1966), has mislabeled inscriptions 18–24 on his key map.

Table 8. Cross-References of Inscription Numbers

McIntosh *The Piri Reis Map of 1513*	Akçura *Piri Reis Haritasi* Text + Map p. 23–25	Afetinan *Oldest Map* Text p. 28–34	Afetinan *Life and Times* Text p. 29–35	Kahle *Lost Map* Text + Map p. 23–25	Hapgood *Sea-Kings* Text p. 220–24	Hapgood *Sea-Kings* Map p. 221
1	1*	1	1	–	1	1
2	2	2	2	6	2	2
3	3	3	3	7	3	3
4	4	4	4	14	4	4
5	5	5	5	15	5	5
6	6	6	6	16	6	6
7	7	7	7	22	7	7
8	8	8	8	23	8	8
9	9	9	9	24	9	9
10	10	10	10	26	10	10
11	11	11	11	20	11	11
12	12	12	12	–	12	12
13	13	13	13	2	13	13
14	14	14	14	1	14	14
15	15	15	15	4	15	15
16	16	16	16	12	16	16
17	17	17	17	11	17	17
18	18	18	18	21	18	24
19	19	19	19	8	19	18
20	20	20	20	10	20	19
21	21	21	21	9	21	20
22	22	22	22	3	22	21
23	23	23	23	18	23	22
24	24	24	24	17	24	23
25**	–	–	–	19	–	–
26	–	–	–	25	–	–
27	–	–	–	5	–	–
28	–	–	–	–	–	–
29	18***	–	–	13	–	–
30	–	–	–	–	–	–

* Although inscription no. 1 is transliterated into the modern Turkish alphabet in Akçura, *Piri Reis Haritasi*, map facing p. 25, it was not translated into English in the text but instead noted as "illegible." The English translation given in the text is from Afetinan, *Life and Works*, 29, and Afetinan, *Oldest Map*, 28.

** Several inscriptions on the map facing p. 25 in Akçura, *Piri Reis Haritasi*, (1935), though transliterated into the modern Turkish alphabet, were not numbered or translated. These six inscriptions, nos. 25–30, are herein presented as additions to and extensions of the numbering system of Akçura.

*** This inscription, transliterated into the modern Turkish alphabet on the map facing p. 25 in Akçura, *Piri Reis Haritasi* (1935), was numbered as no. 18, the same number as another inscription. It is numbered and translated as inscription no. 29 in the present text.

NOTES

INTRODUCTION

1. Most maps from the late Middle Ages and early Renaissance have disappeared, so some caution must be used in generalizing from the relatively small number that have survived. See R. A. Skelton, *Maps: A Historical Survey of Their Study and Collecting* (Chicago: University of Chicago Press, 1975), 26; and Wilcomb E. Washburn, ed., *Proceedings of the Vinland Map Conference* (Chicago: University of Chicago Press, 1971), 56.

2. Paul Kahle, *Die Verschollene Columbus-Karte von 1498 in einer Türkischen Weltkarte von 1513* (Berlin: Walter de Gruyter, 1933), 51–52; and Charles H. Hapgood, *Maps of the Ancient Sea-Kings: Evidence of Advanced Civilization in the Ice Age* (New York: Chilton, 1966), 38 fig. 18, 254–60.

3. William H. Babcock, *Legendary Islands of the Atlantic: A Study in Medieval Geography*, American Geographical Research Series, no. 8 (New York: American Geographical Society, 1922), 187–88; and Zdeněk Kukal, *Atlantis in the Light of Modern Research* (Amsterdam: Elsevier, 1984), 54.

4. The lands of the Western Hemisphere were, of course, discovered tens of thousands of years ago by people from Asia long before the Norse, Columbus, Cabot, Cabral, or any other Europeans "discovered" America. The term *discovery* has been used for so long to characterize the geographical expansion of Europeans, particularly from the fifteenth century onwards, that it continues to be an acceptable and appropriate word. The implied ethnocentricity has been more than adequately revealed and made explicit such that the connotation no longer applies. For a discussion of the various meanings and the uses of the word *discovery* in the context of European geographical expansion, see Clinton Edwards, "The Discoveries of Mexico and the Meaning of Discovery," *Terrae Incognitae* 17 (1985): 61–67.

5. Andrew Sinclair, *The Sword and the Grail: Of the Grail and the Templars and the True Discovery of America* (New York: Crown, 1992), 16, 109, 111.

6. The format used for listing the maps in appendix A is based upon that used in Lawrence C. Wroth, "The Early Cartography of the Pacific," *Papers of the Bibliographical Society of America* 38, no. 2 (1944): 237–66; and Lawrence C. Wroth, *The Voyages of Giovanni da Verrazzano, 1524–1528* (New Haven: Yale University Press, 1970), 288–305.

CHAPTER ONE *The Life of Piri Reis*

1. This summary of the life of Piri Reis is based on A. Afetinan, *The Oldest Map of America, Drawn by Piri Reis*, trans. Leman Yolaç (Ankara: Türk Tarih Kurumu Basi-

mevi, 1954), 6–15; A. Afetinan, *Life and Works of Piri Reis,* Publications of Turkish Historical Association, S. VII, no. 69a, trans. Leman Yolaç and Engin Uzmen (Ankara: Turkish Historical Association, 1975), 9–17, 56–59; Franz Babinger, "Piri Muhyi 'l-Din Re'is," in *Encyclopedia of Islam,* ed. M. Th. Houtsma (Leiden: E. J. Brill, 1936), 3:1070–71; Mert Bayat, foreword to *Kitab-i Bahriye,* by Piri Reis, 4 vols. (Istanbul: Historical Research Foundation, 1988), 1:16–18; Andrew Hess, "Piri Reis and the Ottoman Response to the Voyages of Discovery," *Terrae Incognitae* 6 (1974): 21–29; Kahle, *Columbus-Karte von 1498,* 11–15; Svat Soucek, "Piri Re'is," in *Encyclopedia of Islam* (Leiden: E. J. Brill, 1993 [1960–]), 8:308–9; George William Frederick Stripling, *The Ottoman Turks and the Arabs, 1511–1574,* Illinois Studies in the Social Sciences, vol. 26, no. 4 (Urbana: University of Illinois Press, 1942), 94–95; and Sevim Tekeli, "Pirī Rais (or Re'is), Muhyī al-Dīn," in *Dictionary of Scientific Biography,* ed. Charles Coulston Gillispie (New York: Charles Scribner's Sons, 1974), 10:616–19. Piri Reis appears as a character in the novel *The Wanderer* by Mika Waltari, trans. Naomi Walford (New York: G. P. Putnam's Sons, 1951). The Piri Reis map and its alleged depiction of subglacial Antarctica play an important role in the science fiction novel by Allan W. Eckert, *The HAB Theory* (Boston: Little, Brown, 1976).

2. Afetinan, *Life and Works,* 9.

3. Basic studies of the *Bahriye* include Paul Kahle, ed. and trans., *Piri Re'îs, Bahrîje: Das türkische Segelhandbuch für das Mittelländische Meer vom Jahre 1521,* 2 vols. (Berlin: Walter de Gruyter, 1926–27); Paul Kahle, "Piri Reis und seine Bahrije," in *Beitrage zur historischen Geographie, Kulturgeographie, Ethnographie, und Kartographie, vornehmlich des Orients,* ed. Hans Mžik (Leipzig: F. Deuticke, 1929); Piri Reis, *Kitab-i Bahriye,* facsimile of 1526 manuscript in the Ayasofya Library, no. 2612, Turkish Historical Society Publication, no. 2 (Istanbul: Türk Tarih Kurumu, 1935); Piri Reis, *Kitab-i Bahriye,* facsimile of 1526 manuscript in the Ayasofya Library, no. 2612, ed. Ertuğrul Zekâi Ökte, vol. 1 (Istanbul: Historical Research Foundation, 1988); and Svat Soucek, "A propos du livre d'instructions nautiques de Piri Re'is," *Revue des Études Islamiques* 41, no. 2 (1973): 241–55. Soucek cites many references to the *Bahriye* in the works of others, both European and Turkish. Kahle, *Piri Re'îs, Bahrîje,* is an incomplete critical edition and translation of the 1521 version of the *Bahriye.* Piri Reis, *Kitab-i Bahriye* (1935), is a facsimile of the 1526 recension. Piri Reis, *Kitab-i Bahriye* (1988), is both a facsimile and translation of the same recension. Reproductions of the charts of Italian coasts from the *Kitabi-i Bahriye* known as Marsili 3609 manuscript in the University of Bologna library are in Antonio Ventura, *Gli stati italiani di Piri Re'is: la cartografia turca alla corte di Solimano il Magnifica* (Cavallino di Lecce: Capone Editore, 1991); Antonio Ventura, *La Puglia di Piri Re'is: la cartografia turca alla corte di Solimano il Magnifica* (Cavallino di Lecce: Capone Editore, 1987); and Antonio Ventura, *Il Regno di Napoli di Piri Re'is: la cartografia turca alla corte di Solimano il Magnifico* (Cavallino di Lecce: Capone Editore, 1987).

4. The title of Piri Reis's book has been variously translated as "Book of Navigation" (Afetinan, *Life and Works,* 57); "Book of Maritime Matters" [Thomas D. Goodrich, "Ottoman Portolans," *Portolan: Journal of the Washington Map Society* 7 (1986): 7];

"Book about Maritime Matters" [Richard W. Stephenson, "Arlington H. Mallery and Piri Reis' Chart of the Atlantic Ocean," *Bulletin of the Special Libraries Association, Geography and Map Division*, no. 148 (June 1987): 32]; "Book of Sailing Directions" (Soucek, "A propos du livre," 242); "Naval Manual" [Osman Mardin, "Piri Reis: Turkish Admiral and Cartographer," *Map Collector* 16 (September 1981): 17]; "On Navigation" (Afetinan, *Oldest Map*, 17; Tekeli, "Pirī Rais," 619); "On the Sea" [Yusuf Akçura, "Turkish Interest in America in 1513: Piri Reis's Chart of the Atlantic," *Illustrated London News*, 23 July 1932, 142]; "Book of the Sea" [Stanford Shaw, *History of the Ottoman Empire and Modern Turkey*, vol. 1, *Empire of the Gazis: The Rise and Decline of the Ottoman Empire, 1280–1808* (Cambridge: Cambridge University Press, 1976), 107, 147; Svat Soucek, "The 'Ali Macar Reis Atlas' and the *Deniz Kitabi:* Their Place in the Genre of Portolan Charts and Atlases," *Imago Mundi* 25 (1971): 26; E. H. Van de Waal, "Manuscript Maps in the Topkapi Saray Library, Istanbul," *Imago Mundi* 23 (1969): 83]; "Book of the Mariner" [Esin Atil, *The Age of Sultan Süleyman the Magnificent* (New York: Harry N. Abrams, 1987), 81]; "Book of the Navy" [Bayat, *Kitab-i Bahriye*, 1:24; Paul Lunde, "Piri Reis and the Columbus Map," *Aramco World* 43 (May–June 1992): 20]; "Book of Seafaring" (Bayat, *Kitab-i Bahriye*, 1:24; Soucek, "Piri *Re'is*," 308); "The Shapes of the Islands of the Mediterranean" [Lloyd A. Brown, *The Story of Maps* (New York: Bonanza Books, 1949), frontispiece]; and "Book of Sea Lore" (Hess, "Ottoman Response," 22).

5. Paul Kahle, "Piri Re'is: The Turkish Sailor and Cartographer," *Journal of the Pakistan Historical Society* 4 (April 1956): 101–3; and Piri Reis, *Kitab-i Bahriye* (1988), 47.

6. Shaw, *Ottoman Empire*, 107; Goodrich, "Ottoman Portolans," 7.

7. Afetinan, *Life and Works*, 18 n. 1; Thomas D. Goodrich, "The New World in the Ottoman World: Some Ottoman Thoughts and Some American Things," in *Mundialización de la ciencia y cultural nacional*, Proceedings of the International Congress on Science and the Discovery of America (Madrid, 1993), 118; Goodrich, "Ottoman Portolans," 7; Svat Soucek, "Islamic Charting in the Mediterranean," chap. 14 in *Cartography in the Traditional Islamic and South Asian Societies*, vol. 2, bk. 1 of *The History of Cartography*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1992), 272 n. 25; and Soucek, "Piri Re'is," 309.

8. Hapgood, *Sea-Kings*, 62 fig. 39; Ibrahim Hakki Konyali, *Topkapi Sarayinda deri üzerine yapilmiş eski haritalar* (Istanbul: Zaman Kitaphanesi, 1936), 122–30; Mardin, "Piri Reis," 21; Sadi Selen, "Piri Reis'in Şimali Amerika Haritasi (1528)," *Belleten* 1 (April 1937): 515–23; Tekeli, "Pirī Rais," 618 fig. 2; and Van de Waal, "Manuscript Maps," 83, 90 fig. 1.

9. There appears to be some uncertainty regarding where Piri Reis was executed. For instance, Stripling, *Ottoman Turks*, 94, gives Constantinople (Istanbul) as the location, whereas Babinger, "Piri Muhyi 'l-Din *Re'is*," 1070, Kahle, "Turkish Sailor," 105, and Soucek, "Piri Re'is," 309, believe it occurred in Cairo.

10. Censuses of the existing manuscript copies of the first and second recensions are given in Afetinan, *Life and Works*, 70–71; Afetinan, *Oldest Map*, 60–61; A. Afetinan, *Piri*

Reis'in Amerika Haritasi, 1513–1528 (Ankara: Türk Tarih Kurumu Basimevi, 1954), 65–66; and Soucek, "Islamic Charting," 290–91. See also Thomas D. Goodrich, "Old Maps in the Library of Topkapi Palace in Istanbul," *Imago Mundi* 45 (1993): 120–33.

11. According to the standards set by Harley and Woodward, *History of Cartography,* the term *portolan* is reserved for a text of sailing directions and the term *portolan chart* is used for cartographic representations. See Soucek, "Islamic Charting," 263; Goodrich, "New World," 115; and Helen M. Wallis and Arthur H. Robinson, *Cartographic Innovations: An International Handbook of Mapping Terms to 1900* (Tring, Hertfordshire: Map Collector Publications, 1987), 9.

12. William Brice, Colin Imber, and Richard Lorch, *The Aegean Sea-Chart of Mehmed Reis Ibn Menemenli, A.D. 1590/1,* Seminar on Early Islamic Science, monograph no. 2 (Manchester, Eng.: University of Manchester, 1977).

13. Abdülhak Adnan-Adivar, *Osmanli Türklerinde Ilim,* annotated by A. Kazancigil and S. Tekeli (Istanbul: Remzi Kitabevi, 1982), 80–81; Soucek, "Ali Macar Reis Atlas," 19, 25–26; and Soucek, "A propos du livre," 248 n. 1. For a differing view, see William Brice and Colin Imber, "Turkish Charts in the 'Portolan' Style," *Geographical Journal* 144 (November 1978): 528–29; and Brice, Imber, and Lorch, *Aegean Sea-Chart.*

14. George H. Beans, "Some Notes from the Tall Tree Library," *Imago Mundi* 7 (1950): 92n; Goodrich, "Ottoman Portolans," 9; Soucek, "Islamic Charting," 277; Soucek, "A propos du livre," 249 n. 1; and Van de Waal, "Manuscript Maps," 83. Kahle, "Turkish Sailor," 100–101, 103–5, alternatively suggests that the first version of the *Bahriye* was a straightforward translation by Piri Reis of an older *isolario* or portolan that had the same common origin as Sonetti's book.

CHAPTER TWO *Description of the Map*

1. There seems to be some uncertainty as to when the map was first found. Some sources give 9 October 1929, e.g., Adolf Deissmann, *Forschungen und Funde im Serai: Mit einem Verzeichnis der nichtislamischen Handscriften im Topkapu Serai in Istanbul* (Berlin: Walter de Gruyter, 1933), 112; Kahle, *Columbus-Karte von 1498,* 5; and Konyali, *Topkapi Sarayinda,* 66. Others give 9 November 1929, e.g., Abdülhak Adnan-Adivar, *La Science chez les Turcs Ottomans* (Paris: Librairie Orientale et Américaine, 1939), 74; and Afetinan, *Oldest Map,* 3. Enrique de Gandía, *Américo Vespucci y Sus Cinco Viajes al Nuevo Mundo* (Buenos Aires: Fundación Banco de Boston, 1991), 279–80, has January 1929. Roberto Levillier, *América, la bien llamada* (Buenos Aires: Editorial Guillermo Kraft, 1948), 1:42, 145, confusedly gives both 1917 and 1922 (both incorrect) as the year of discovery. See also Leo Bagrow, "A Tale of the Bosphorus," *Imago Mundi* 12 (1955): 28. In 1995, Dr. Joseph H. Fitzgerald of Miami, Florida, obtained in Turkey a manuscript map on paper that was a copy of South America on the Piri Reis map. It is not certain if this map predates the 1929 rediscovery of the Piri Reis map. If it is not a modern copy (as it appears likely to be), then presumably the Piri Reis map was not entirely lost between 1517, when it was given to Sultan Selim, and 1929, when it came to light again, and at least a portion of it was used and copied by at least one cartographer.

2. Brice, Imber, and Lorch, *Aegean Sea-Chart*, 5 (unpaginated); Kahle, *Piri Re'îs, Bahrîje*.

3. Paul Kahle, "Eine Amerika-Karte, gezeichnet auf Grund einer Columbus-Karte und portugiesischer Karten vom Türken Piri Re'is im Jahre 1513," *Actes du XVIIIe Congrès International des Orientalistes*, Leiden (7–12 September 1932): 105–6. Gandía, *Américo Vespucci*, 280, misidentifies the meeting as the International Congress of Americanists. Kahle's first publication on the Piri Reis map was "Impronte Columbiane in una Carta Turca del 1513," *La Cultura Moderna* 10 (1931): 775–85. The announcement of this discovery was more widely publicized in two newspaper articles: "A Columbus Controversy: America—and Two Atlantic Charts," *Illustrated London News*, 27 February 1932, 307; and Akçura, "Turkish Interest," 132–43. Kahle's work on the Piri Reis map was favorably received in Eugen Oberhummer, "Eine Karte des Columbus in türkischer Überlieferung," *Mitteilungen der Geographischen Gesellschaft in Wien* 77, nos. 7–9 (1934): 115–17; Eugen Oberhummer, "Eine turkische Karte zur Entdeckung Amerikas," *Anzeiger der Akademie der Wissenschaften in Wien, Philos-histor. Klasse*, nos. 8–27 (1931): 99–112; and Eugen Oberhummer, "Die verschollene Columbus-Karte von Amerika vom Jahre 1498 in einer türkischen Weltkarte von 1513," *Forschungen und Fortschritten* 8 (July 1932).

4. See the bibliography for a list of works by Kahle relating to the Piri Reis map of 1513.

5. There are slight differences in the reported size of the Piri Reis map: 90 cm × 63 cm [Kenneth Nebenzahl, *Atlas of Columbus and the Great Discoveries* (Chicago: Rand McNally, 1990), 63; and Soucek, "Piri Re'is," 308]; ca. 86 cm × 60 cm [Paul Kahle, "A Lost Map of Columbus," *Geographical Review* 23 (October 1933): 621]; 90 cm × 65 cm [Michel Mollat du Jourdin and Monique La Roncière, with Marie-Madeleine Azard, Isabelle Raynaud-Nguyen, and Marie-Antoinette Vannereau, *Sea Charts of the Early Explorers, Thirteenth to Seventeenth Century*, trans. L. le R. Dethan (New York: Thames and Hudson, 1984), 218; Pierluigi Portinaro and Franco Knirsh, *The Cartography of North America, 1500–1800* (New York: Facts on File, 1987), 47; and Sevim Tekeli, "The Map of America by Piri Reis," *Erdem* 1, no. 3 (1985): 676]; 85 cm × 60 cm (Babinger, "Piri Muhyi 'l-Din Re'is," 1070; Deissmann, *Forschungen und Funde im Serai*, 111; and Kahle, *Columbus-Karte von 1498*, 13); 87 cm × 63 cm [Van de Waal, "Manuscript Maps," 82; and Hans Wolff, "America—Early Images of the New World," in *America: Early Maps of the New World*, ed. Hans Wolff, trans. Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag), 43]; and 86 cm × 62 cm [Smithsonian Institution, *Art Treasures of Turkey* (Washington, D.C.: Smithsonian Institution, 1966), 104].

6. Tekeli, "Map of America," 676, states that (besides southwestern Europe, West Africa, and Central America) the Middle East is shown, which is incorrect.

7. Although primacy for the portolan chart has been variously claimed for Genoa, Venice, Catalonia, or Majorca, it probably developed first in the Italian cities before spreading to the western Mediterranean. See Tony Campbell, "Portolan Charts from the Late Thirteenth Century to 1500," chap. 19 in *Cartography in Prehistoric, Ancient,*

and Medieval Europe and the Mediterranean, vol. 1 of *The History of Cartography,* ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press), 390.

8. Ibid., 379.

9. For a complete description of portolan charts and their likely origin, see ibid., 371–463; James E. Kelley Jr., "Perspectives on the Origins and Uses of the Portolan Charts," *Cartographica* 32 (autumn 1995): 1–16; James E. Kelley Jr., "Working Concepts re the Origin and Use of the Portolan Chart" (typescript, Menlo Park, Penn., 1989); Jonathan T. Lanman, *On the Origin of Portolan Charts,* Hermon Dunlap Smith Center for the History of Cartography, Occasional Publication, no. 2 (Chicago: Newberry Library, 1987); A. E. Nordenskiöld, *Periplus: An Essay on the Early History of Charts and Sailing Directions* (1897; rpt., New York: Burt Franklin, n.d. [1967?]); Edward Luther Stevenson, *Portolan Charts: Their Origin and Characteristics,* Publications of the Hispanic Society of America, no. 82 (New York: Hispanic Society of America, 1911); and Heinrich Winter, "The Origin of the Sea Chart," *Imago Mundi* 13 (1956): 39–44.

10. Campbell, "Portolan Charts," 377; and Piri Reis, *Kitab-i Bahriye* (1988), 87.

11. Red for towns and forts, black for uninhabited features, according to Piri Reis, *Kitab-i Bahriye* (1988), 89.

12. Hapgood, *Sea-Kings,* 31, locates the central rose on the longitude of Alexandria, at 29°51 E, claiming that all ancient Greek geographers based their maps on this meridian. His source for this assertion is unknown. Rhodes, at 28°14 E, was the commonly used central point of the ancient Greeks according to O. A. W. Dilke, *Greek and Roman Maps* (Ithaca, N.Y.: Cornell University Press, 1985), 31, 33 fig. 4, 75, 78, 151, 175.

13. Although the Catalan Atlas is conventionally attributed to 1375, the reasons given by Felipe Fernández-Armesto, *Before Columbus: Exploration and Colonisation from the Mediterranean to the Atlantic, 1229–1492,* New Studies in Medieval History, ed. Maurice Keen (London: Macmillan Education, 1987), 159; and Gonçal de Reparaz, *Catalunya a les mares, navegants, mercaders i cartògrafs catalans de l'edat mitjana i del renaixement* (Barcelona: Editorial Mentora S. A., 1930), 82–93, are more compelling for c. 1380.

14. Piri Reis, *Kitab-i Bahriye* (1988), 87; and Wallis and Robinson, *Innovations,* 164.

15. A similar attempt at a suggestive reconstruction of the Piri Reis world map of 1513 was made by the eminent historian Svat Soucek, of Princeton University, in his excellent summarization of Ottoman-Turkish cartography contained in Harley and Woodward, *History of Cartography.* Soucek, "Islamic Charting," 269 fig. 14.6, used the Cantino map of 1502 as the basis for his proposed reconstruction instead of the Francisco Rodrigues charts of c. 1511–13 used in the present work. The Rodrigues charts include more up-to-date information than the Cantino map and more likely represent the quality of the geographical and cartographical knowledge of the Portuguese available to Piri Reis in 1513. That the coast of South America on the Piri Reis map is virtually identical to the same coast on the Francisco Rodrigues chart of South America while showing greater differences with the Cantino map substantiates that Piri Reis, as he wrote in inscription no. 6, used recent Portuguese maps in compiling his map. For reconstructions of the Rodrigues charts into a single map, see Armando Cortesão, *The Suma Oriental of Tomé Pires and The Book of Francisco Rodrigues,* 2 vols. (London: Hakluyt Society, 1944), 2:

folding map in back pocket; Armando Cortesão and Avelino Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 6 vols. (1960; reprint, with additions, Lisbon: Imprensa Nacional-Casa da Moeda, 1987), 1:83 fig. 8; and Heinrich Winter, "Francisco Rodrigues' Atlas of ca. 1513," *Imago Mundi* 6 (1946): 24.

16. Many of the illustrations of the Piri Reis map used in books are not of the map itself but of one of the many reproductions and facsimiles that have been made since the map's discovery in 1929. The 1935 edition of facsimiles, published by the Turkish Historical Society, is one of the more commonly reproduced illustrations and is easily recognized by the facsimile stamp near the lower right-hand corner in the South Atlantic. This facsimile was the map used, for instance, as a frontispiece in Hapgood, *Sea-Kings,* and as an illustration in Erich von Däniken, *Chariots of the Gods?* trans. Michael Heron (New York: Bantam Books, 1971), plate opp. p. 78; and Wolff, "Early Images," 43.

17. For example, Felipe Fernández-Armesto, *Columbus* (Oxford: Oxford University Press, 1991), pl. 8 opp. p. 101; Cyrus Gordon, *Before Columbus: Links between the Old World and Ancient America* (New York: Crown, 1971), 71; Francis King, *The Cosmic Influence,* New Library of the Supernatural series, (Garden City, N.Y.: Doubleday, 1976), 75; Mollat du Jourdin and La Roncière, *Sea Charts,* pl. 28; Nebenzahl, *Columbus,* 63; Portinaro and Knirsh, *North America,* pl. 7; Soucek, "Islamic Charting," 268; "A Turkish Portrait of the World in 1513," *National Geographic Magazine* 185 (March 1994): preceding p. 1; von Däniken, *Chariots,* plate facing p. 78; and Wolff, "Early Images," 43. The outline of the map in Soucek, "Islamic Charting," 269, commendably shows the correct orientation.

18. Soucek, "Islamic Charting," 270.

19. Also noted by Hapgood, *Sea-Kings,* 42.

20. Although various theories have been given for the origin of the larger New World scale, such as differing units of measurement, the effects of combining different scaled maps, etc., it may represent the effects of dead reckoning and the declination of the magnetic compass. Portolan charts and expanded portolan-style maps were drawn based on the results of dead reckoning sailing. A latitude map, for instance, would be useless to a dead reckoning sailor. See James E. Kelley Jr., "Columbus's Navigation: Fifteenth-Century Technology in Search of Contemporary Understanding" (paper read at the Patristic Medieval Renaissance Conference, Villanova University, Villanova, Penn., 26 September 1992); James E. Kelley Jr., "Distortions on Sixteenth-Century Maps of America," *Cartographica* 32 (winter 1995): 1–13; James E. Kelley Jr., "The Map of Bahamas Implied by Chaves's *Derrotero:* What Is Its Relevance to the First Landfall Question?" *Imago Mundi* 42 (1990): 26–49; James E. Kelley Jr., "Still Lost in the Indies after All These Years: Interpreting Early Maps of America" (paper read at the thirty-fourth annual meeting of the Society for the History of Discoveries, Mackinac Island, Mich., 24 September 1994); Douglas C. Peck, *Cristoforo Colombo: God's Navigator* (Columbus, Wisc.: Columbian, 1993); and David W. Tilton, "Latitudes, Errors, and the Northern Limit of the 1508 Pinzón and Solís Voyage," *Terrae Incognitae* 25 (1993): 25–40, and the literature cited therein.

21. A few early maps depicting the New World have a "double equator," that is, the

equator in the New World is about 5° higher (i.e., farther north) than the equator in the Old World. Examples are the King-Hamy-Huntington map of c. 1502–4 and the Diego Gutierrez chart of the Atlantic Ocean of 1550 (which also has a double tropic of Cancer). Sometimes maps were shown with two latitude scales, e.g., the Claudius Clavus map of 1427. This double gradation of latitudes, and the related oblique meridian, apparently were the cartographer's method of compensating for magnetic variation, because the compass was used by the mariner in dead reckoning navigation. It is possible the apparent mislocation of the equator on the Piri Reis map, shown slightly south of its true location at the mouth of the Amazon, is due to a double equator on at least one of the charts he used in compiling his map. See Mollat du Jourdin and La Roncière, *Sea Charts*, pl. 46, 230–32; George E. Nunn, *World Map of Francesco Roselli* (also titled *Roselli Oval World Map*) (Philadelphia: Privately printed, 1928), 6 n. 33; Edward Luther Stevenson, "Martin Waldseemüller and the Early Lusitano-Germanic Cartography of the New World," *Bulletin of the American Geographical Society* 36, no. 4 (1904): 207; E. G. R. Taylor, "Hudson's Strait and the Oblique Meridian," *Imago Mundi* 3 (1939): 48–52; and Heinrich Winter, "The Pseudo-Labrador and the Oblique Meridian," *Imago Mundi* 2 (1937): 61–73. It should be noted, however, that Columbus himself wrote that El Mina, on the African coast at 5° N, was on the equator, so it is possible his incorrect observation may have played a role in the development of the "double equator"; see George E. Nunn, *The Geographical Conceptions of Columbus: A Critical Consideration of Four Problems* (1924; reprint, with additions, Milwaukee: American Geographical Society Collection of the Golda Meir Library, University of Wisconsin, 1992), 7. Conversely, Columbus may have supposed El Mina to be on the equator because he may have seen it thus on a map with a double equator. Hapgood, *Sea-Kings*, 30, 38 fig. 18, also concluded that there was evidence on the Piri Reis map for a "double equator," although his reasons were based on his unusual theories of portolan chart projections.

22. G. R. Crone, *Maps and Their Makers: An Introduction to the History of Cartography* (London: Hutchinson's University Library, 1953), 84–85; Kelley, "Columbus's Navigation," 21–23; Kelley, "Map of Bahamas," 43–44; Kelley, "Still Lost," 7–10; and Tilton, "Latitudes," 25–40.

23. The Salviati planisphere is ascribed to Ribero by Louis-André Vigneras, "The Cartographer Diogo Ribeiro," *Imago Mundi* 16 (1962): 80, but this attribution is denied by Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1:87. It was probably made by Ribero's predecessor at the Casa de la Contratación, Nuño García de Toreno. See Luisa Martín Merás, "Spanische Kartographie," in *Lexikon zur Geschichte der Kartographie*, ed. Ingrid Kretschmer, Johannes Dörflinger, and Franz Wawrik, 2 vols. (Vienna: Franz Deuticke, 1986), 2:759; and Manuel de la Puente y Olea, *Los trabajos geográficos de la Casa de Contratación* (Seville: Escuela tipográfica y librería Salesianas, 1903), 302. The surviving Ribero (Ribeiro) maps are the Castiglioni (or Mantua) world map of 1525, the Weimar-Spanish world map of 1527, the Vatican map of 1529, the Weimar-Ribero map of 1529, the Dillingen world map fragment of 1530, and the Wolfenbüttle B map of c. 1532. See appendix A.

24. Bayat, *Kitab-i Bahriye*, 1:21, states that because of the double scale, one can measure distances as small as nine miles on the map, but this is not possible.

25. The calculation of the length of a degree according to the Piri Reis map was made by James E. Kelley Jr., who, besides being well known for his studies of Christopher Columbus, is also an eminent historian of medieval and Renaissance metrology (the science of weights and measures), particularly regarding navigation and cartography. The author wishes to thank him for sharing the results of his analysis. See Kelley, "Columbus's Navigation," 11–14; and Robert Hues, *Tractatus de globis et eorum usu*, trans. John Chilmead, ed. Clements R. Markham (1869; rpt., New York: Burt Franklin, n.d. [1963?]), 80–94.

26. Nunn, *Geographical Conceptions*, 8–11.

27. Campbell, "Portolan Charts," 378; Sandra Sider, with Anita Andreasian and Mitchell Codding, *Maps, Charts, Globes: Five Centuries of Exploration* (New York: Hispanic Society of America, 1992), xv; and Wallis and Robinson, *Innovations*, 12.

28. Piri Reis, *Kitab-i Bahriye* (1988), 89.

29. Afetinan, *Life and Works*, 29–35; Afetinan, *Amerika Haritasi*, 33–39; Afetinan, *Oldest Map*, 28–34; Yusuf Akçura, *Piri Reis Haritasi* (1935; rpt., Istanbul: Seyirve Hidrografi Dairesi, 1966), 20–25; Dr. Thomas Goodrich of Indiana University in Pennsylvania (personal correspondence); Kahle, "Lost Map," 621–638; Lunde, "Piri Reis," 19–25; and Josiah Marvel, "Lucaiarum Tabula Onomastica: A Toponymy of the Lucayan Archipelago" (typescript, Providenciales, Turks and Caicos Islands, British West Indies, 1988), 24–26. Svat Soucek, *Piri Reis and Turkish Mapmaking after Columbus: The Khalili Portolan Atlas*, vol. 2 of *Studies in the Khalili Collection* (London: Nour Foundation and Azimuth Editions, 1992; New York: Nour Foundation, Azimuth Editions, and Oxford University Press, 1996), which was not available when the present book was written, contains many improved translations from the map and is recommended to the reader. A Spanish translation of the map inscriptions is given in Federico B. Kirbus, *Enigmas, Misterios y Secretos de América: Tiahuanaco, Las líneas de Nazca, Vilcabamba, El mapa de Piri Reis* (Buenos Aires: Editorial La Barca Gráfica, 1976), 87–90.

30. Piri Reis, *Kitab-i Bahriye* (1988), 197.

31. Oliver Dunn and James E. Kelley Jr., *The Diario of Christopher Columbus's First Voyage to America, 1492–1493* (Norman: University of Oklahoma Press, 1989), 112–13; E. G. R. Taylor, *The Haven-Finding Art: A History of Navigation from Odysseus to Captain Cook* (London: Hollis and Carter, 1956), 109; and David Woodward, "Medieval *Mappaemundi*," chap. 18 in *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, vol. 1 of *The History of Cartography*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1987), 287.

32. Soucek, "Islamic Charting," 270, for instance, translates *mappaemundi* in inscription no. 6 as "world maps."

33. Dilke, *Maps*, 155; Lunde, "Piri Reis," 20.

34. Abbas Hamdani, "An Islamic Background to the Voyages of Discovery," in *The Legacy of Muslim Spain*, ed. Salma Khadra Jayyusi (New York: E. J. Brill, 1992), 295 n. 31;

and John Kirtland Wright, *The Geographical Lore of the Time of the Crusades* (New York: American Geographical Society, 1925), 271–72. Deissmann, *Forschungen und Funde,* 115, translates the Turkish inscription to read the *seas* of the Persian Gulf, Indian Ocean, and the Chinese Sea. Kahle, *Columbus-Karte von 1498,* 14, has the *seas* of the Indus region, India, and China. Afetinan, *Life and Works,* 28, interprets the passage to mean that there was an Arabic map of the West (*sic;* should be East) Indian and Chinese seas and parts of Africa. See also Marco Polo, *The Travels of Marco Polo,* 2 vols., trans. Henry Yule, rev. Henri Cordier (reprint of 1929 3d printing of 1903 3d ed., New York: Dover, 1993), 2:425–6.

35. Soucek, "Islamic Charting," 270 n. 13. Regarding the spellings of *jaferya* and *ca'feriye,* the letter *c* in the modern Turkish alphabet represents the *j* sound in English.

36. Dilke, *Maps,* 80–81, 154; Tony Campbell, *The Earliest Printed Maps, 1472–1500* (Berkeley: University of California, 1987), 122; Elizabeth Baer, Lloyd A. Brown, and Dorothy E. Miner, comps., *The World Encompassed* (Baltimore: Walters Art Gallery, 1952), no. 4; and Aubrey Diller, "The Oldest Manuscripts of Ptolemaic Maps," *Transactions and Proceedings of the American Philological Association* 71 (1940): 66–67.

37. Van de Waal, "Manuscript Maps," 82, has interpreted this passage to mean that maps made by four Portuguese were used and suggests they might have been the Corte-Reals, that is, João Vaz and his sons, Vasco Annes, Miguel, and Gaspar, the last two being early explorers of Newfoundland.

38. Afetinan, *Oldest Map of America,* 24, 31; Akçura, *Piri Reis Haritasi,* 21; Kahle, "Lost Map," 624; and Kahle, "Turkish Sailor," 106.

39. Atil, *Süleyman,* 78; Afetinan, *Life and Works,* 27–28; Bayat, *Kitab-i Bahriye,* 1:20–21; Tekeli, "Map of America," 677; and M. Yerci, "The Accuracy of the First World Map Drawn by Piri Reis," *Cartographic Journal* 26, no. 2 (1989): 154.

40. Kahle, *Columbus-Karte von 1498,* 14; and Kahle, "Lost Map," 624 n. 6. Piri Reis, *Kitab-i Bahriye* (1988), 91 n. 34, gives the last sea as the Caspian rather than the Red Sea.

CHAPTER THREE *Europe and Africa*

1. Akçura, *Piri Reis Haritasi,* fold-out map.

2. Konrad Kretschmer, *Die Italienischen Portolane des Mittelalters ein Beitrag zur Geschichte der Kartographie und Nautik* (1909; rpt., Hildesheim, Germany: Georg Olms, 1962), 570.

3. Fernández-Armesto, *Before Columbus,* 146–47.

4. Kahle, *Columbus-Karte von 1498,* 16.

5. Fernández-Armesto, *Before Columbus,* 144–46, 158.

6. Campbell, "Portolan Charts," 412.

7. Typical depictions are those on the Cantino map of 1502, Waldseemüller of 1507, and the Francisco Rodrigues chart of the west coast of Africa between 5° N and 16° S of c. 1511–13. These Portuguese columns are also mentioned in the *Bahriye.* See Piri Reis, *Kitab-i Bahriye* (1988), 97, 99.

8. Kahle, *Columbus-Karte von 1498,* 19.

1. Armando Cortesão, *History of Portuguese Cartography*, 2 vols. (Coimbra: Junta de Investigações do Ultramar-Lisboa), 2:56–57 fig. 70, 58–59 table 1.

2. On the cartographic history of Mayda, see Raymond H. Ramsay, *No Longer on the Map* (New York: Viking Press, 1973), 213–22.

3. Pliny, *Natural History*, 10 vols., trans. H. Rackham (London: William Heinemann; Cambridge: Harvard University Press, 1961), 2:488–91.

4. Armando Cortesão, "The North-Atlantic Nautical Chart of 1424," *Imago Mundi* 10 (1953): 2, table 2 opp. p. 6; and Cortesão, *Portuguese Cartography*, 2:55, 56–57 fig. 70, 58–59 table 1.

5. Tekeli, "Pirī Rais," 617, reads this as *Buriko*.

6. E. Bräunlich, "Zwei türkische Weltkarten aus dem Zeitalter der grossen Entdeckungen," *Berichte über die Verhandlungen der Sächssischen Akademie der Wissenschaften zu Leipzig Philologisch-historische Klasse* 89, no. 1 (1937): 21.

7. Paulo Emilio Taviani, *Christopher Columbus: The Grand Design*, trans. William Weaver (London: Orbis, 1985), 310.

8. John Kirtland Wright, *The Leardo Map of the World, 1452 or 1453* (New York: American Geographical Society, 1928), 52.

9. *Encyclopaedia Britannica*, 1955 ed., s.v., "Azores."

10. Taviani, *Columbus*, 309.

11. Ibid., 363.

12. Ibid., 74, 310.

13. Giovanni Battista Ramusio, *Navigationi e Viaggi*, vol. 1 (Venice: Lucantonio Giunti, 1550), 121v.

14. Cortesão, "North-Atlantic Nautical Chart," 8; and Benjamin Keen, trans., *The Life of the Admiral Christopher Columbus by His Son Ferdinand* (New Brunswick, N.J.: Rutgers University Press, 1959), 25.

15. Cortesão, "North-Atlantic Nautical Chart," 8; Henry Harrisse, *The Discovery of North America* (1892; rpt., Amsterdam: N. Israel, 1961), 656; and E. G. Ravenstein, *Martin Behaim's 1492 "Erdapfel"* (also titled *Translation and Commentary on Martin Behaim's "Erdapfel"*), reprint of portion of 1908 edition of *Martin Behaim: His Life and His Globe* (London: Greaves and Thomas, 1992), 21. Because Antilia and the Island of the Seven Cities were often identified with each other, these last two accidental, storm-driven discoveries may refer to the same legendary event, although recorded as being in different years.

16. Washington Irving, *The Voyages of the Companions of Columbus*, vol. 5 of *The Works of Washington Irving* (New York: P. F. Collier & Son, 1880), 421–22; Kahle, *Columbus-Karte von 1498*, 18; and Konyali, *Topkapi Sarayinda*, 85.

17. Campbell, "Portolan Charts," 430.

18. Joseph Judge, ed., *A Columbus Casebook: A Supplement to "Where Columbus Found the New World"* (Washington, D.C.: National Geographic Society, 1986), 62; and Juan Manzano Manzano, *Los Pinzones y el Descubrimiento de América*, 3 vols. (Madrid: Ediciones de Cultura Hispánica, 1988), 1:562.

19. Lunde, "Piri Reis," 21.

20. Armando Cortesão, *The Nautical Chart of 1424 and the Early Discovery and Cartographical Representation of America: A Study on the History of Early Navigation and Cartography* (Coimbra: University of Coimbra, 1954); Cortesão, "North-Atlantic Nautical Chart," 4; and Cortesão, *Portuguese Cartography*, 2:125–39.

21. Campbell, "Portolan Charts," 411 n. 301.

22. Babcock, *Legendary Islands*, 72.

23. Emerson D. Fite and Archibald Freeman, *A Book of Old Maps Delineating American History from the Earliest Days down to the Close of the Revolutionary War* (1926; rpt., New York: Dover, 1969), 8; and Helen Wallis, "Is the Paris Map the Long-Sought Chart of Christopher Columbus?" *Map Collector* 58 (spring 1992): 21.

24. The name has been read as Luculi di Juan by Kahle, "Lost Map," 638. Konyali, *Topkapi Sarayinda*, 101, who followed Kahle in much of his interpretation of the map, reads it as Lekol di Cuvan [i.e., Juwan or Juan] and suggests it is Juan de la Cosa, shipmate of Columbus, explorer of South America, and the maker of the famous map of 1500. During the sixteenth century, it was asserted that Columbus learned of the existence and location of the West Indies from a mariner known as the "Unknown Pilot," whose ship was storm-driven there and who returned to reveal their location to Columbus before dying from the hardships of the voyage. Donald L. McGuirk Jr. has suggested in a personal correspondence to the author that perhaps this map inscription refers to that story.

25. Fridtjof Nansen, *In Northern Mists: Arctic Exploration in Early Times*, trans. Arthur G. Chater, 2 vols. (London: William Heinemann, 1911), 2:207.

26. Kahle, *Columbus-Karte von 1498*, 18–19, 51; Cortesão, "North-Atlantic Nautical Chart," 5–6, table 1 opp. p. 6; and Cortesão, *Portuguese Cartography*, 2:56–57 fig. 70, 58–59 table 1. *Salvage* may be from the French *sauvage*, meaning "woody," and may indicate the island of Madeira. In the fourteenth century, Madeira was named Legname, Italian for "Forest Island," on portolan charts. Madeira is the Portuguese translation of the Italian name. See Konrad Kretschmer, *Die Entdeckung Amerikas in ihrer Bedeutung für die Geschichte des Weltbildes* (Berlin: W. H. Kühl, 1892), 212.

27. Cortesão, "North-Atlantic Nautical Chart," 2, table 2 opp. p. 6; and Cortesão, *Portuguese Cartography*, 2:56–57 fig. 70, 58–59 table 1.

28. Ravenstein, *Behaim*, 77.

29. The origin of the name and location of Antilia has also been attributed to a misinterpretation of a map inscription. See G. R. Crone, "The Origin of the Name Antilia," *Geographical Journal* 91 (March 1938): 260–62.

30. Kahle, *Columbus-Karte von 1498*, 19, 51, reads this place-name as *Santa Tioz* (or *Kioz*).

31. H. C. Adams, *The Wonder Book of Travellers' Tales* (New York: Liveright, 1927), 120; and Henry Stommel, *Lost Islands: The Story of Islands That Have Vanished from Nautical Charts* (Vancouver: University of British Columbia Press, 1984), 121.

32. Adams, *Travellers' Tales*, 122; and Ramsay, *No Longer*, 108–9. This nonexistent island is also shown, though unnamed, on the chart of the west coast of Africa by

Francisco Rodrigues of c. 1511–13. If this is San Mateus, then it also precedes the supposed 1516 date of discovery and may be an earlier cartographic depiction than that of Piri Reis. See Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1: pl. 34, chart no. 8.

33. Adams, *Travellers' Tales*, 121–24; Ramsay, *No Longer*, 108–9; and Stommel, *Lost Islands*, 121.

34. In the *Geographia*, Ptolemy placed the prime meridian at the westernmost island of the Fortunate Isles to the west of the bulge of Africa so that all longitudes for places in the *oikoumene* (known inhabited world) would be east of this meridian. After the rediscovery of the Canary Islands in the Middle Ages, they were identified with the Fortunate Isles of the ancient Greeks, and thus the prime meridian was usually that of Ferro (Hierro). See O. A. W. Dilke, "The Culmination of Greek Cartography in Ptolemy," chap. 11 in *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, vol. 1 of *The History of Cartography*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1987), 184 n. 40.

35. Jaime Cortesão, *História do Brasil nos Velhos Mapas*, vol. 1 (Rio de Janeiro: Instituto Rio Branco, 1965), figs. 3 and 20.

36. Kahle, *Columbus-Karte von 1498*, 19, 51.

37. Charles de La Roncière, *La Carte de Christophe Colomb* (Paris: Éditions Historiques and Édouard Champion, 1924), 14. The Paris map (also sometimes called the "Christopher Columbus Chart" because it was once believed to have been made by him) is usually dated c. 1489–92, although it may be as late as 1500. See Robert H. Fuson, *Legendary Islands of the Ocean Sea* (Sarasota, Fla.: Pineapple Press, 1995), 130.

38. George E. Nunn, "A Reported Map of Columbus," *Geographical Review* 15 (1925): 688–89.

39. Because of the layout of the Aguiar map, these islands are drawn on the double-lined border.

40. Although this illustration depicts Irish monks, Tekeli, "Map of America," 680, mistakenly says that one of the two persons on the back of the whale is a woman.

41. The last word in the inscription was transliterated into modern Turkish as *pappamondo* instead of *mappamondo*; see Akçura, *Piri Reis Haritasi*, 5, and fold-out map. This is interesting in that *pappamondo* occurs in Neapolitan documents of 1480 and 1488 as the word for *map*. This might indicate an Italian source for this remark by Piri Reis. Aldo Blessich, *La geografia nella corte aragonese di Napoli* (Rome, 1897); Vladimiro Valerio, "Astronomia e cartografia nella Napoli Aragonese," *Rivista Geografica Italiana* 100 (1993): 291–303; and Vladimiro Valerio, *Società, uomini e istituzioni cartografiche nel Mezzogiorno d'Italia* (Firenze: Istituto geografico militare, 1993), 31–44.

42. Kahle, *Columbus-Karte von 1498*, 20.

43. Campbell, "Portolan Charts," 445, 446 fig. 19.22, believes the illustration of the ship, the boat with two men, and the whale on the Viladestes chart depict a commercial whaling scene. On the medieval legend of St. Brendan and the whale, see Nansen, *In Northern Mists*, 2:234 n. 1.

44. Cortesão, *Portuguese Cartography*, 1:248.

45. The author wishes to thank James E. Kelley Jr. for this suggestion. The Mecia de Viladestes chart of 1413 shows St. Brendan and the whale in the same orientation as on the Piri Reis map.

46. Wright, *Leardo Map*, 56. Kahle, "Lost Map," 636, translates a portion of this inscription such that the Portuguese opened up the Indian Sea instead of the region of India.

47. Nunn, *World Map*, 17.

48. Piri Reis, *Kitab-i Bahriye* (1988), 83 n. 31.

49. Cecil Jane, *The Four Voyages of Columbus*, reprint of *Select Documents Illustrating the Four Voyages of Columbus*, 1930–33, 2 vols. in 1 (New York: Dover, 1988), 1:18–19; and Samuel Eliot Morison, *Journals and Other Documents on the Life and Voyages of Christopher Columbus* (New York: Heritage Press, 1963), 186.

50. Roberto Almagià, "Il Mappamondo di Piri Reis e la Carta di Colombo del 1498," *Bolletino della R. Società Geografica Italiana* 17 (June–July 1934): 445 n. 1; Roberto Almagià, "Piri Re'is' World Map and Columbus' Chart of 1498," *Hydrographic Review* 11 (November 1934): 195 n. 1; and Konrad Kretschmer, "Die Verschollene Kolumbuskarte von 1498 in einer Türkischen Weltkarte von 1513," *Petermanns Mitteilungen* 80 (1934): 49.

CHAPTER FIVE *South America*

1. Previously known as the Canerio map, the mapmaker's signature has also been read as Caveri and the map is now usually referred to as the Caveri map. The maker's name, however, is probably Canerio and the map will be referred to by this older name. See Wroth, *Verrazzano*, 289–90.

2. Orville A. Derby, "The Egerton Map of Early American Discoveries," *Geographical Journal* 38 (November 1911): 496.

3. Samuel Eliot Morison, *Portuguese Voyages to America in the Fifteenth Century*, Harvard Historical Monographs, no. 14 (Cambridge: Harvard University Press, 1940), map opp. p. 100, 103; James Penn, comp., *The South American Pilot. Part I. The East Coast of South America from Cape St. Roque to Cape San Antonio, Rio de la Plata; and the North Coast from Cape St. Roque to the Rio Maroni in French Guayana* (London: Hydrographic Office, Admiralty, 1864), 103–7 (esp. 105).

4. Samuel Eliot Morison, *The European Discovery of America: The Southern Voyages, A.D. 1492–1616* (New York: Oxford University Press, 1974), 282n.

5. The author expresses his gratitude to James E. Kelley Jr. for this information on the Portuguese word for bay.

6. Kahle, *Columbus-Karte von 1498*, 17.

7. Kahle, *Columbus-Karte von 1498*, 51; and Paul Kahle, "Un Mapa de América Hecho por el Turco Piri Re'is, en el Año 1513, Basándose en un Mapa de Colón y en Mapas Portugueses," *Investigación y Progreso* 5 (1 December 1931): 171. On maps of this period it was not uncommon for place-names to begin with lowercase letters.

8. Lunde, "Piri Reis," 25.

9. Kahle, *Columbus-Karte von 1498*, 17, 52; and Frederick J. Pohl, *Amerigo Vespucci: Pilot Major* (New York: Columbia University Press, 1944), 117–18.

10. Afetinan, *Oldest Map*, 26, suggests *Katino* is present-day Ilha Santa Catarina, at 27°30′ S. This is unlikely. The island of Santa Catalina, the original Spanish name, was so named by Sebastian Cabot in 1526 in honor of his wife. See Morison, *Southern Voyages*, 544–45. Neither does there appear to be a connection between *Katino* and Cantino, the name inscribed on the back of the famous anonymous Portuguese world map of 1502.

11. Discussed in Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1:10.

12. Harrisse, *North America*, 289ff; and Wroth, *Verrazzano*, 44–53.

13. The strong similarity between the Francisco Rodrigues map of Brazil of c. 1511–13 and the Piri Reis map of 1513 was apparently first noticed by Ernesto Reguera Sierra, "El Mapa de Piri Reis," *Revista Geográfica Americana* 38 (July–October 1954): 43, 46. See also Max Justo Guedes, "O Mapa de Piri Reis (1513): Um Quebra-Cabeças Histórico?" *Revista Maritima Brasileira* 114 (July–September 1994): 135 fig. 20, 136 fig. 21.

14. Kahle, *Columbus-Karte von 1498*, 17, 51; Afetinan, *Life and Works*, 29.

15. Kahle, *Columbus-Karte von 1498*; Kahle, "Lost Map"; Hapgood, *Sea-Kings*.

16. Kahle, *Columbus-Karte von 1498*, 16–17, 23, 51; Hapgood, *Sea-Kings*, 38 fig. 18. Incredibly, because of an imagined similarity between the island of Marajó at the mouth of the Amazon and the island of Trinidad near the mouth of the Orinoco, Hapgood, *Sea-Kings*, 65 fig. 41, 66, mistakenly supposed that Mercator misplaced Marajó over 1,000 miles to the northwest on his world map of 1569.

17. A. E. Nordenskiöld, *Facsimile-Atlas to the Early History of Cartography with Reproductions of the Most Important Maps Printed in the Fifteenth and Sixteenth Centuries*, trans. Johan Adolf Ekelöf and Clements R. Markham (1889; reprint, New York: Dover, 1973).

18. Kahle, *Columbus-Karte von 1498*, 16–17, 51; Hapgood, *Sea-Kings*, 30, 38 fig. 18, 64–65, 257.

19. Hapgood, *Sea-Kings*, 68, 260; Hans Wolff, "Martin Waldseemüller: The Most Important Cosmographer in a Period of Dramatic Scientific Change," in *America: Early Maps of the New World*, ed. Hans Wolff, trans. Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim (Munich: Prestel-Verlag, 1992), 114.

20. This euhemistic equating of all cartographic features with real geographical features has lead at least one scholar, Hans Wolff, "Waldseemüller," 114, to conclude that the mountains shown on the western edge of "Terra Ulteri Incognita," i.e., "Unknown Land of the Further Side," on the Waldseemüller map of 1507 are the Rocky Mountains, which were definitely unknown to European mapmakers at the beginning of the sixteenth century.

21. This persistent confusion between the early mapmakers and more recent commentators regarding the identification of the rivers and estuaries visited by early Spanish

and Portuguese explorers and depicted on the early maps led to a long-standing dispute between France and Brazil as to the boundary between French Guiana and Brazil. See Joaquim Caetano da Silva, *L'Oyapoc et l'Amazone: Question Brésilienne et Française* (Paris: L. Martinet, 1861); and *Frontières entre le Brésil et la Guyane Française: Mémoire présenté par les Etats Unis du Brésil au gouvernement de la Confédération Suisse arbitre choisi selon les stipulations du traité conclu à Rio-de-Janeiro, le 10 avril 1897 entre le Brésil et la France*, 3 vols. (Paris: A. Lahure, 1899), 1:47–68.

22. Literature dealing with the problem of identifying the estuaries of the Brazilian littoral on early maps includes J. Denucé, "The Discovery of the North Coast of South America According to an Anonymous Map in the British Museum," *Geographical Journal* 36 (July 1910): 65–80, 128; Orville A. Derby, "The Northeast Coast of Brazil in Ancient Cartography," *Science*, n.s., 19 (29 April 1904): 681–94; Henry Harrisse, *The Diplomatic History of America: Its First Chapter, 1452–1493–1494* (London: B. F. Stevens, 1897), 124–31; E. Roukema, "Brazil on the Cantino Map," *Imago Mundi* 17 (1963): 7–26; and E. Roukema, "Some Remarks on the La Cosa Map," *Imago Mundi* 14 (1959): 38–54.

23. There is a large body of literature on the origin, survival, and transmission of the ancient and medieval monstrous races, three excellent references being John Block Friedman, *The Monstrous Races in Medieval Art and Thought* (Cambridge: Harvard University Press, 1981); Florence McCulloch, *Mediaeval Latin and French Bestiaries*, Studies in the Romance Languages and Literature, no. 33, rev. ed. (Chapel Hill: University of North Carolina Press, 1962); and Rudolf Wittkower, "Marvels of the East: A Study in the History of Monsters," *Journal of the Warburg and Courtauld Institutes* 5 (1942): 159–97.

24. Atil, *Süleyman*, 80; George Sarton, *From Rabbi Ben Ezra to Roger Bacon*, vol. 2 of *Introduction to the History of Science* (Baltimore: Carnegie Institution of Washington, 1931), 868–70; and John Stephenson, *The Zoological Section of the Nuzhatu-l-Qulūb of Hamdullāh al-Mustaufī al-Qazwīnī* (London: Royal Asiatic Society, 1928), xii–xiv.

25. Wilma George, "The Yale," *Journal of the Warburg and Courtauld Institutes* 31 (1968): 425.

26. I. Bernard Cohen, "What Columbus 'Saw' in 1492," *Scientific American* 267 (December 1992): 105, identifies this animal on the Piri Reis map as a unicorn, with which the monoceros was sometimes confused. See also Ann Payne, *Medieval Beasts* (New York: New Amsterdam Books, 1990), s.v. "monoceros."

27. For a general overview of the monstrous races as depicted on medieval maps, see Woodward, "*Mappaemundi*," 330–32.

28. Atil, *Süleyman*, 78; Gandía, *Vespucci*, 284; Wilma George, *Animals and Maps* (Berkeley: University of California Press, 1969), 60, 61 fig. 3.2, 64; and Kahle, *Columbus-Karte von 1498*, 18.

29. For example, Cohen, "Columbus," 103; and Fernández-Armesto, *Columbus*, pl. 8 opp. p. 101.

30. Woodward, "*Mappaemundi*," 332 n. 223.

31. Piri Reis, *Kitab-i Bahriye* (1988), 141–45.

32. The author wishes to express his gratitude to Dr. Thomas Goodrich, professor emeritus of Indiana University of Pennsylvania for providing translations for inscriptions 28 and 29.

33. Curiously, Afetinan, *Life and Works,* 36; and Afetinan, *Oldest Map,* 35, though correct in attributing this southern land connection to the Ptolemaic geographical ideas of the time, mistakenly wrote that this southern land extended *westward* from South America, rather than eastward as the map plainly shows. This same error of direction was repeated by Tekeli, "Map of America," 680.

34. Lunde, "Piri Reis," 25, sees in these islands and the triangular indented mainland to the south a possible repetition of certain Caribbean features of the Piri Reis map and suspects this may be due to the attempts to combine and reconcile a number of charts.

35. Harrisse, *North America,* 567 n. 585, writing before the Piri Reis map was known, suggested that the place-name Terra de Sier on the Paris Gilt Globe was from Terra desierta (uninhabited land).

36. Rodney Shirley, *The Mapping of the World: Early Printed World Maps, 1472–1700,* 2d ed. (London: Holland Press, 1987), no. 71. The conventional practice when referencing maps from this work is to cite their "Shirley Number," i.e., entry number, rather than page number.

37. Fridtjof Nansen, *In Northern Mists: Arctic Exploration in Early Times,* trans. Arthur G. Chater (London: William Heinemann, 1911), 2:206.

38. Edward Heawood, "The World-Map of Piri Reis, 1513: Review," *Geographical Journal* 82 (September 1933): 269, suggests the extension of the coastline of South America to the south of the Atlantic may be due to the voyage of Vespucci in 1501–2.

39. See Mark Graubard, trans., and John Parker, ed., *Tidings out of Brazil* (Minneapolis: University of Minnesota Press, 1957).

40. The name Terra Australis was not applied to the Southern Continent until the 1531 map by Oronce Fine. It became the widely used and common term to denote the Southern Continent and is sometimes anachronistically used in the present work in referring to the Southern Continent on the Piri Reis map. See Wroth, "Pacific," 169.

41. For a discussion of possible reasons for the route of Cabral's fleet, see William Brooks Greenlee, *The Voyage of Pedro Álvares Cabral to Brazil and India from Contemporary Documents and Narratives* (1938; reprint, Nendeln, Liechtenstein: Kraus, 1967), xlvi–lx.

42. Greenlee, *Cabral,* xlvi–lx, the standard reference work on the circumstances by which Brazil was discovered by Cabral, does not consider the possibility of weather conditions. According to Greenlee, there is very little contemporary information why the Cabral fleet took the course that led to the landfall of Brazil. There is, however, the report of a Portuguese pilot of Cabral's voyage, given in Ramusio, *Navigationi,* 1:121v, that Cabral was driven by a storm to Brazil. This evidence presented by Piri Reis, presumably copied from Portuguese source maps, as he states in inscription no. 8, may be independent contemporary evidence bearing upon the discovery of Brazil by Cabral. Without citing their sources, John Boyd Thacher, *Christopher Columbus: His Life, His Work, His Remains,* 3 vols. (New York: G. P. Putnam's Sons, 1903–4), 2:444 n. 3, states

that the "expedition found itself unexpectedly driven on the shores of Brazil," and Henry Stevens, *Historical and Geographical Notes on the Earliest Discoveries of America, 1453–1530* (1869; reprint, New York: Burt Franklin, 1970), 30, states that "Cabral was blown out of his course." Presumably, this information is from Ramusio. Inscription no. 8 on the Piri Reis map and the report of the pilot given by Ramusio are apparently the only near contemporary instances in which the discovery of Brazil by Cabral is attributed to the weather, i.e., winds or storms.

43. The author is grateful to Michael Dunlap for calculating this latitude.

CHAPTER SIX *The Southern Continent*

1. W. A. R. Richardson, "Mercator's Southern Continent: Its Origins, Influence, and Gradual Demise," *Terrae Incognitae* 25 (1993): 86–88.

2. For some discussion of this issue, see ibid., 86–88; and Roukema, "Brazil," 17–19.

3. Armando Cortesão, *Cartografia e cartógrafos portugueses dos séculos XV e XVI*, 2 vols. (Lisbon: Seara Nova, 1935), 1:341–42.

4. A. S. Osley, *Mercator: A Monograph on the Lettering of Maps, etc., in the Sixteenth-Century Netherlands, with a Facsimile and Translation of His Treatise on the Italic Hand and a Translation of Ghim's Vita Mercatoris*, with a foreword by R. A. Skelton (New York: Watson-Guptill, n.d. [1969]), 190.

5. The sea route around southern Africa on the Martin Behaim Globe of 1492 is cited by O. A. W. Dilke, *Maps*, 64, as a reconciliation between Ptolemy and the new discoveries.

6. Edward Heawood, "An Undescribed Map of Lopo Homem, 1519," *Geographical Journal* 76 (August 1930): 160.

7. Noted by Roukema, "Brazil," 16, 17.

8. Ibid., 16 n. 45.

9. Heawood, "An Undescribed Map of Lopo Homem, 1519," 159–60.

10. Louis-André Vigneras, "Greenland, Vinland, and the Yale Map," *Terrae Incognitae* 4 (1972): 62–63.

11. Pohl, *Vespucci*, 227.

12. Afetinan, *Life and Works*, 53, 66–67. See bibliography.

13. Afetinan, *Life and Works*, pl. 12 (fig. 14); and Afetinan, *Oldest Map*, 50.

14. Misidentified by Afetinan, *Life and Works*, 61, pl. 16 (fig. 19); and Afetinan, *Oldest Map*, 52, as a map by Jean Severs of 1514. Jan Severszoon, or Johannes Severus, did publish a woodcut map of the world in 1514, but it was not this manuscript map reproduced by Afetinan.

15. Afetinan, *Life and Works*, 61, pl. 20 (fig. 23); and Afetinan, *Oldest Map*, 55.

16. Afetinan, *Life and Works*, pl. 17 (fig. 20).

17. Afetinan, *Life and Works*, pl. 19 (fig. 22); and Afetinan, *Oldest Map*, 53.

18. Afetinan, *Life and Works*, pl. 23 (fig. 26); and Afetinan, *Oldest Map*, 54.

19. Afetinan, *Life and Works*, 65, pl. 34 (fig. 37); and Afetinan, *Oldest Map*, 38.

20. Afetinan, *Oldest Map*, 38, 50–55.

21. Afetinan, *Life and Works*, 35–36, 50; and Afetinan, *Oldest Map*, 35, 41, 58.

22. See, e.g., Hugh Pope, "Legacy of Turkey's 'Immortal' Ataturk Slowly Starts to Fade," *Los Angeles Times*, 15 January 1991, H4.

23. Arlington H. Mallery, with Daniel L. Linehan and M. I. Walters, "New and Old Discoveries in Antarctica" (radio broadcast by the Georgetown University Forum, Washington, D.C., 26 August 1956); Arlington H. Mallery and Mary Roberts Harrison, *The Rediscovery of Lost America*, revision of 1951 edition of *Lost America: The Story of Iron-Age Civilization prior to Columbus*, by Mallery, with additions by Harrison (New York: E. P. Dutton, 1979), 199, 201, 203–4. For the Swithinbank map, see J. J. Holtzscherer and G. de Q. Robin, "Depth of Polar Ice Caps," *Geographical Journal* 120 (June 1954): fig. 8 on fold-out map opp. p. 263.

24. Unfortunately, a copy of this illustration of a quality reproducible for this book was not obtainable. Copies of the transcript of the radio program, "New and Old Discoveries in Antarctica," which include the maps and illustrations made by Mallery, may be obtained from Special Collections, Georgetown University Library, Box 57114, Washington, D.C. 20057-1174. The illustration under question is on page E between pages 4 and 5.

25. Hapgood, *Sea-Kings*, 76 fig. 46, 77 fig. 47.

26. Mallery and Harrison, *Lost America*, 205–6. See also Mallery, "Antarctica," 5.

27. King, *Cosmic Influence*, 73; and Mallery and Harrison, *Lost America*, 203, 206.

28. Mallery and Harrison, *Lost America*, 201–3, 206–7.

29. A. H. Mallery to William Briesemeister, letter, Washington, D.C., 16 September 1958, American Geographical Society Collection, University of Wisconsin–Milwaukee.

30. Mallery, "Antarctica," 3; Mallery and Harrison, *Lost America*, 204–5.

31. Mallery and Harrison, *Lost America*, 207.

32. Louis Pauwels and Jacques Bergier, *Le matin des magiciens* (Paris: Gallimard, 1960), 203; and Louis Pauwels and Jacques Bergier, *The Morning of the Magicians*, trans. Rollo Myers (New York: Stein and Day, 1964), 120.

33. Donald E. Keyhoe, *Aliens from Space* (Garden City, N.Y.: Doubleday, 1973), 231–36; and Donald E. Keyhoe, *Flying Saucers: Top Secret* (New York: Putnam, 1960), 212–14.

34. King, *Cosmic Influence*, 72–74, incorrectly states that Mallery and Hapgood studied the Piri Reis map together in the 1950s.

35. Hapgood's theories regarding the projections used on the Piri Reis map and other old maps apparently were accepted by at least one scholar of academia, Sevim Tekeli, professor of the history of science at the University of Ankara. In his 1985 article, "The Map of America by Piri Reis," *Erdem* 1, no. 3 (1985): 677, Tekeli uncritically accepts Hapgood's theories regarding the five projection points of the Piri Reis map, discussed in Hapgood, *Sea-Kings*, 5–38, esp. 26–28.

36. Timothy Ferris, "Playboy Interview: Erich von Däniken," *Playboy*, August 1974, 51; von Däniken, *Chariots*, 14–16; and Erich von Däniken, *In Search of Ancient Gods: My Pictorial Evidence of the Impossible*, trans. Michael Heron (New York: Putnam, 1973), 133–37.

37. For example, Atil, *Süleyman*, 80; Pedro Guirao, *El Enigma de los Mapas de Piri*

Reis (Barcelona: Libroexprés, 1980); Graham Hancock, *Fingerprints of the Gods* (New York: Crown, 1995), 3–25; Kirbus, *Enigmas;* and M. H. J. Th. van der Veer and P. Moerman, *Hidden Worlds: Fresh Clues to the Past: Did Columbus, Magellan, and Piri Reis Know the Glareanus Maps?* trans. A. D. Hills (London: Souvenir Press, 1974). For a review exposing the fallacies of Hancock's interpretation of the Piri Reis map, see Gregory C. McIntosh, "Old Maps Misused and Abused," review of *Fingerprints of the Gods,* by Graham Hancock, *California Map Society Newsletter* (1996): 11–13.

38. Ivan T. Sanderson, *Uninvited Visitors: A Biologist Looks at UFO's* (London: Neville Spearman, 1969), 200.

39. Afetinan, *Amerika Haritasi,* 39; Afetinan, *Life and Works,* 35; and Afetinan, *Oldest Map,* 35.

40. Yerci, "World Map," 155.

41. Henry Hallam, *Introduction to the Literature of Europe in the Fifteenth, Sixteenth, and Seventeenth Centuries,* 4 vols. (London: John Murray, 1872), 2:354–55.

42. For instance, Charles Berlitz, *Atlantis, the Eighth Continent* (New York: Putnam, 1984), 56; Charles Berlitz, *Mysteries from Forgotten Worlds* (Garden City, N.Y.: Doubleday, 1978), 16; Cohen, "Columbus," 103; and Mallery, "Antarctica," 3.

43. Gordon, *Before Columbus,* 70, 173.

44. Ibid., 78–79, 106.

45. Piri Reis, *Kitab-i Bahriye* (1988), 43.

46. Ivan Van Sertima, *They Came before Columbus* (New York: Random House, 1976), 235.

47. Alan R. Gillespie, "Stone Henge and the Piri Re'is Map," *Navigation: Journal of the Institute of Navigation* 17 (summer 1970): 122–23.

48. A Dutchman's log is a buoyant object, e.g., a wooden log or spittle, thrown overboard and used to determine the speed of the ship relative to the object.

49. Manuel Gómez Márquez, *La Atlántida de Piri Reis* (Barcelona: Fontana Fastástica, Ediciones Martínez Roca, S.A., 1984); and Wendy Stein, *Atlantis* (San Diego: Greenhaven Press, 1989), 69.

50. Berlitz, *Atlantis,* 44, 80, 56. Similarly, David O. True apparently believed that Columbus knew of the West Indies before his first voyage because Columbus had read about them in an old book. See inscription no. 5 and the explanation that follows it in the text; and David O. True to Ena L. Yonge, letter, 3 August 1961, American Geographical Society Collection, University of Wisconsin.

51. John G. Weihaupt, "Historic Cartographic Evidence for Holocene Changes in the Antarctic Ice Cover," *Eos* 65 (28 August 1984): 493–496, 498–501; and John G. Weihaupt, reply to letters of Daniel J. Milton and Louis Lliboutry, *Eos* 65 (18 December 1984): 1226–27.

52. See Louis Lliboutry, Letter to Editor, *Eos* 65 (18 December 1984): 1226; Daniel J. Milton, Letter to Editor, *Eos* 65 (18 December 1984): 1226; and Weihaupt, Reply, 1226–27.

53. Clifford Wilson, *The Chariots Still Crash* (New York: New American Library, 1975), 161–63; Daniel Cohen, *The Ancient Visitors* (Garden City, N.Y.: Doubleday, 1976),

77–86; Ronald Story, *The Space-Gods Revealed* (New York: Harper and Row, 1976), 27–33; William H. Stiebing Jr., *Ancient Astronauts, Cosmic Collisions, and Other Popular Theories about Man's Past* (Buffalo, N.Y.: Prometheus Books, 1984), 91–94; and Laura Foreman, ed., *Feats and Wisdom of the Ancients,* volume of *Library of Curious and Unusual Facts* series, ed. Russell B. Adams Jr. (Alexandria, Va.: Time-Life Books, 1990), 129. For other examples, see Harold L. Burstyn, review of *Maps of the Ancient Sea-Kings,* by Charles H. Hapgood, *Terrae Incognitae* 1 (1969): 77; Foreman, *Ancients,* 126–29; and Helen Wallis, review of *Maps of the Ancient Sea-Kings,* by Charles H. Hapgood, *Geographical Journal* 133 (September 1967): 394–95.

54. David C. Jolly, "Was Antarctica Mapped by the Ancients?" *Skeptical Inquirer* 11 (fall 1986): 32–43.

55. Hapgood, *Sea-Kings,* 176–77.

56. Jolly, "Antarctica," 37.

57. Phyllis Young Forsyth, *Atlantis: The Making of Myth* (Montreal: McGill-Queen's University Press, 1980), 109.

58. Hapgood, *Sea-Kings,* quoted in Stein, *Atlantis,* 69–71.

59. Hapgood, *Sea-Kings,* 185–90; and King, *Cosmic Influence,* 74.

60. Berlitz, *Atlantis,* 130–33; Berlitz, *Mysteries,* 21–23; and Rene Noorbergen, *Secrets of the Lost Races: New Discoveries of Advanced Technology in Ancient Civilizations* (Indianapolis: Bobbs-Merrill, 1977), 94–100.

61. Foreman, *Ancients,* 128; Hapgood, *Sea-Kings,* 78–98, esp. 83–93; and Jolly, "Antarctica," 36–37.

62. Hapgood, *Sea-Kings,* 51–54.

63. For example, Hancock, *Fingerprints,* 8; von Däniken, *Chariots,* 15–16, plate following p. 78; and von Däniken, *Ancient Gods,* 134 figs. 174 and 175. Afetinan, *Life and Works,* pl. 37 (fig. 40), pl. 38 (fig. 41), was taken in by Hapgood's use of this azimuth equidistant projection map. Mardin, "Piri Reis," 18, claims that a comparison between the Piri Reis map and the azimuth equidistant projection map shows the Piri Reis map is more accurate than when compared with a Mercator projection. The functions of the azimuth equidistant and Mercator projections are different, so neither is "more accurate." Neither projection is intended to merely represent the globe on a plane. The purpose of the azimuth equidistant projection, which shows all points on the globe, and the Mercator projection (equatorial cylindrical orthomorphic projection), which mathematically cannot show all of the points of the globe, is to show the shortest distance between two points on the globe as a straight line. On the former, one of the two points must be the point of tangency of the projection; on the latter, it can be any two points on the map, although this distance cannot be directly measured, unless the two points are on the same latitude. The Mercator projection does, however, show the correct direction for this line in relation to north, while the azimuth equidistant projection does not.

64. Berlitz, *Atlantis,* 131; Hapgood, *Sea-Kings,* 181–84 et seq.; and Noorbergen, *Secrets,* 97.

65. Richard E. Mooney, *Colony: Earth* (New York: Stein and Day, 1974), 114–15.

66. Hapgood, *Sea-Kings,* 22, 229; and Mardin, "Piri Reis," 18. The latitude of Syene was also the central parallel on Ptolemy's second projection. See Dilke, *Maps,* 79.

67. Wroth, *Verrazzano,* 206.

68. The depiction of California as an island survived past about 1760 for some mapmakers, such as in German geographies of the late eighteenth century and on Japanese maps as late as 1865! For the history of this cartographical idea, see John Leighly, *California as an Island: An Illustrated Essay* (San Francisco: Book Club of California, 1972); Glen McLaughlin, with Nancy Mayo, *The Mapping of California as an Island: An Illustrated Checklist,* California Map Society Occasional Paper no. 5 (Saratoga: California Map Society, 1995); Dora Beale Polk, *The Island of California: A History of the Myth* (Spokane, Wash.: Arthur C. Clark, 1991); Ramsay, *No Longer,* 227–32; R. V. Tooley, *California as an Island,* Map Collector Series, no. 8 (London: Map Collectors' Circle, 1964); reprinted in R. V. Tooley, "California as an Island," in *The Mapping of America,* ed. R. V. Tooley (1980; rpt., London: Holland Press, 1985); Henry R. Wagner, *Cartography of the Northwest Coast of America to the Year 1800* (Berkeley: University of California Press, 1937), 1:114–17, 125–29, 144–47; and Henry R. Wagner, "Some Imaginary California Geography," *Proceedings of the American Antiquarian Society,* n.s., 36 (April 1926): 102–29. Eventually, of course, California (or at least that portion west of the infamous San Andreas Fault) will, according to current plate tectonic theory, become an island off the west coast of North America, not too dissimilar to its depiction on many seventeenth-century maps.

69. Fernández-Armesto, *Before Columbus,* 151–52.

70. W. A. R. Richardson, "The Origin of Place-Names on Maps," *Map Collector* 55 (summer 1995): 18–23; W. A. R. Richardson, "Piloting a Toponymic Course through Sixteenth-Century Southeast Asian Waters," *Terrae Incognitae* 20 (1988): 1–20; and Wilcomb E. Washburn, "Representation of Unknown Lands in Fourteenth-, Fifteenth-, and Sixteenth-Century Cartography," *Agrupamento de Estudos de Cartografia Antiga* 35 (1969): 3–20.

CHAPTER SEVEN *The Christopher Columbus Inscription*

1. Piri Reis, *Kitab-i Bahriye* (1988), 189–99.

2. Samuel Eliot Morison, *The Second Voyage of Christopher Columbus* (Oxford: Oxford University Press, 1939), 16–17.

3. Jane, *Four Voyages,* 1:32; and Morison, *Journals,* 235.

4. Morison, *Journals,* 211–12, 235–38.

5. Henry Harrisse, *Notes on Columbus* (New York: Privately printed, 1866), 76; and Thacher, *Columbus,* 1:210.

6. Samuel Eliot Morison, *Admiral of the Ocean Sea,* abridged in 1 vol. (Boston: Little, Brown, 1942), 414–19; Morison, *Journals,* 212, 237–38; and Morison, *Southern Voyages,* 110–11.

7. Roukema, "La Cosa Map," 45; David Divine, *The Opening of the World: The Great Age of Maritime Exploration* (New York: Putnam, 1973), 136.

8. The author wishes to thank James E. Kelley Jr. for the suggestion regarding the precession of the pole.

9. Morison, *Journals*, 273.

10. Camillus E. Branchi, *The Birth of America: A Contribution to the History of America* (New York: Vigo Press, 1937), 51.

11. Piri Reis, *Kitab-i Bahriye* (1988), 189.

12. Ravenstein, *Behaim*, 21; and Keen, *Columbus*, 25.

13. Kahle, "Lost Map," 627 n. 9; and Piri Reis, *Kitab-i Bahriye* (1988), 197.

14. Kahle, "Lost Map," 626 nn. 9, 10; and Piri Reis, *Kitab-i Bahriye* (1988), 191. On the parrot's "wool," see the discussion on inscription no. 3 in chapter 10.

15. Washington Irving, *The History of the Life and Voyages of Christopher Columbus* (1827–28; reprint, 2 vols. in 1, London: Henry G. Bohn, 1850), 1:195; Keen, *Columbus*, 112.

16. Hans-Albrecht von Burski, "Kemal Re'is: Ein Beitrag zur Geschichte der türkischen Flotte," Ph.D. diss., University of Bonn, 1928, 60; Kahle, *Columbus-Karte von 1498*, 15; and Kahle, "Lost Map," 626. Afetinan, *Life and Works*, 28, incorrectly states that the map inscription says that the Spaniard took part in all *four* of Columbus's voyages, while accepting the belief that the Spaniard and map were probably captured in 1501, which would be anachronistic because Columbus's fourth voyage began in 1502. Curiously, in the same work (*Life and Works*, 12), Afetinan contradictorily states that Piri Reis acquired the Columbus map sometime between 1493 and 1498. Several writers, e.g., Matthew Black, "Paul Ernst Kahle," *Proceedings of the British Academy* 51 (1966): 488–89, say that an inscription on the Piri Reis map states that the Columbian source map was obtained in a sea battle near Valencia in 1501. This is not correct. Kahle based this inference for the date on his research of Burski, "Kemal Re'is." Curiously, R. A. Skelton, "The Cartography of Columbus' First Voyage," appendix in *The Journal of Christopher Columbus*, trans. Cecil Jane, (1930; reprint, with additions, New York: Bramhall House, 1960), 223, states that the Columbus source map was obtained in 1497 from an Italian prisoner.

17. Almagià, "World Map," 194; Charles H. Cotter, "Piri Reis: Admiral Extraordinary," *Journal of Navigation* 25 (April 1972): 249; William Lemos, "The Quest for the Santa Maria," *Naval Institute Proceedings* 118, no. 2 (1992): 109. Lemos repeats a story he had heard that the Spanish prisoner was named Lemos. The surviving crew lists of the four voyages of Columbus, published in Alicia B. Gould, *Nueva lista documentada de los tripulantes de Colón en 1492* (Madrid: Real Academia de la Historia, 1984), do not record any sailors with this name.

18. Lunde, "Piri Reis," 25; and Piri Reis, *Kitab-i Bahriye* (1988), 198–99.

19. Soucek, "Islamic Charting," 277 n. 42.

20. Baer, Brown, and Miner, *World Encompassed*, no. 82; Leo Bagrow, "Supplementary Notices to 'The Origin of Ptolemy's Geographia,'" *Imago Mundi* 4 (1947): 71–72;

Beans, "Notes," 91–92; Campbell, *Printed Maps,* 90; Derek Howse and Michael Sanderson, *The Sea Chart: An Historical Survey Based upon the Collections in the National Maritime Museum* (New York: McGraw-Hill, 1973), 21; Kahle, "Turkish Sailor," 100–101; and R. A. Skelton, introduction to *Libro do Benedetto Bordone: Nel qual si ragiona de tutte l'isole del mondo,* by Benedetto Bordone, Series of Atlases in Facsimile, 3d ser. (1528; reprint, Amsterdam: Theatrum Orbis Terrarum, 1966), 1:v–vi.

21. Cesáreo Fernández Duro, ed., *Pleitos de Colón,* 2 vols., vols. 7 and 8 of *Colección de documentos inéditos relativos al descubrimiento, conquista y organización de las antiguas posesiones españolas de Ultramar,* 2d ser., 25 vols. (Madrid: Real Academia de la Historia, 1892–94), 2:228; Harrisse, *North America,* 388–89; and Manzano Manzano, *Pinzones,* 1:32–35.

22. Nunn, *Roselli,* 4.

23. John Fiske, *The Discovery of America,* 2 vols. (Boston: Houghton Mifflin, 1892), 1: 399–400; Kahle, "Lost Map," 626; and Taviani, *Columbus,* 491–93.

24. Leo Bagrow, *Die Geschichte der Kartographie* (Berlin: Safari-Verlag, 1951), 181; Leo Bagrow, *History of Cartography,* rev. and enl. by R. A. Skelton, trans. D. L. Paisey (Cambridge: Harvard University Press; London: C. A. Watts, 1964), 210; and Leo Bagrow, *Meister der Kartographie,* rev. and enl. by R. A. Skelton (Berlin: Safari-Verlag, 1963), 305.

25. Morison, *Admiral* (abr.), 109–11.

26. Harrisse, *Notes,* 75; and Thacher, *Columbus,* 1:210; Richard Eden, *A Treatyse of the Newe India,* translation of part of book 5 of *Cosmographiae universalis,* by Sebastian Münster (1553; reprint, Ann Arbor, Mich.: Readex Microprint, 1966), 5v, unpaginated.

CHAPTER EIGHT *Puerto Rico and the Lesser Antilles*

1. William P. Cumming, *The Southeast in Early Maps, with an Annotated Check List of Printed and Manuscript Regional and Local Maps of Southeastern North America during the Colonial Period,* 2d ed. (Chapel Hill: University of North Carolina Press, 1962), 1; and James A. Williamson, *The Cabot Voyages and Bristol Discovery under Henry VII* (Cambridge: Hakluyt Society, 1962), 75.

2. The difficulties in reading the Arabic script and the "migration" of place-names to nearby locations by copyists during transmission and compilation have caused problems of identification for several commentators, notably Almagiá, Kahle, and those who followed Kahle in his interpretations. See Morison, *Second Voyage,* 16 n. 2. The names of several Lesser Antilles islands were shifted to other islands by Spanish mariners soon after Columbus's second voyage. See Carl Ortwin Sauer, *The Early Spanish Main* (Berkeley: University of California Press, 1966), 192 n. 30.

3. Morison, *Southern Voyages,* 112.

4. Morison, *Journals,* 214 n. 6.

5. Kahle, *Columbus-Karte von 1498,* 22–23; Kahle, "Lost Map," 628; and Paul Kahle, "Die Verschollene Columbus-Karte von Amerika von Jahre 1498 in einer Türkischen Weltkarten von 1513," *Forschungen und Fortschritte* 8 (1 July 1932): 248.

6. Some examples of Italicisms from Columbus's spoken mother tongue creeping into his written Spanish are given in Virgil I. Milani, "Italicisms in Christopher Columbus' First American Bulletin," *Forum Italicum* 2 (March 1968): 40–43, who postulates that Columbus often thought in one language (Ligurian Italian) and wrote in another (Spanish).

7. Margaret S. Dilke and A. Brancati, "The New World in the Pesaro Map," *Imago Mundi* 31 (1979): 78, 82.

8. The Virgin Islands are shown as a somewhat similar cluster of islands on the map of S. Giovanni (i.e., Puerto Rico) in Tomasco Porcacchi da Castilione, *l'Isole più famose del Mondo* (Venice: S. Galignani, 1576), a late sixteenth-century printed isolario.

9. Morison, *Admiral* (abr.), 420.

10. In the letter of 13 December 1494, from Nicolò Syllacio to the duke of Milan, it is stated that the city of Isabela on Hispaniola is named after the island of Bella insula or Isola Bella, meaning Hispaniola. See Jane, *Four Voyages*, 1:65 n. 2; Morison, *Journals*, 242; and Thacher, *Columbus*, 2:258. A similar confusion of Isla Bella for Isabela, a Columbian island name in the Bahamas, was made in the first printed version of the Letter to Santangel written by Columbus in February–March 1493 and printed in early April 1493. See Cristoforo Colombo, *Epistola de Insulis Nuper Inventis*, reprint of Latin translation by Leander di Cosco of 1493, translated into English by Frank E. Robbins (Ann Arbor, Mich.: Readex Microprint, 1966), foreword; Morison, *Admiral* (abr.), 375–79; and Morison, *Journals*, 180–82, 187 n. 2. These confusions and misprints may perhaps have influenced Almagià. Some later printed versions of Columbus's letter, such as the Letter to Sánchez, translated and printed in April–May 1493, correctly give the name as Isabela (Hysabellam). See Colombo, *Epistola*, iv, unpaginated.

11. Later, Hapgood, *Sea-Kings*, 38 fig. 18, 60 fig. 36, 63–64, 256, and other researchers also failed to notice that by its name (*Sanjuwan bastido*, i.e., San Juan Bautista), shape (same as on the La Cosa map), and location (relative to the Virgin Islands and the Lesser Antilles), this island was Puerto Rico, and they misidentified it as Hispaniola.

12. Almagià, "Mappamondo," 446; and Almagià, "World Map," 196.

13. Almagià, "Mappamondo," 448–49; and Almagià, "World Map," 198.

14. Read as Sant Lamo by Kahle, "Turkish Sailor," fold-out map facing p. 100.

15. Morison, *Second Voyage*, 80.

16. Hapgood, *Sea-Kings*, 69–70, assumed that the names given to the Lesser Antilles were from the Columbus source map. Then, noting that some of the names were given to the wrong islands, he concluded that Piri Reis "did not really see a map drawn by Columbus." Although it is obvious that someone mixed up the names of the Lesser Antilles on some map, Hapgood assumed it was neither Piri Reis nor Columbus, so it must have been an intermediary map; therefore, Piri Reis did not use a Columbus map. This may assume too much about the copying abilities of Piri Reis (or his calligrapher). If Piri Reis could make copying errors in regards to the locations of place-names (see figs. 28, 29, and 30), then the errors may not have been present on his source map; ergo, he could have used a Columbus map.

17. Almagià, "World Map," 198 n. 1.

18. Kahle, "Mapa de América," 170.

19. For other theories on the origin of the name Saba, see J. Hartog, *History of Saba* (Saba, Netherlands Antilles: Van Guilder N.V., 1975), 12–14; Morison, *Second Voyage,* 77–78; and Morison, *Journals,* 227–28.

20. Kahle, "Mapa de América," 170, has Samo Chresto and suggests this name is the island of San Christóbal named by Columbus. Kahle, *Columbus-Karte von 1498,* 22, 51, and Kahle, "Lost Map," 628, read Samo Kresto and say that it is the island of Santa Cruz, also named by Columbus. Almagià, "World Map," 198 n. 1, has Samo Cresto.

21. Kahle, "Mapa de América," 170; and Samuel Eliot Morison, *Admiral of the Ocean Sea,* 2 vols. (Boston: Little, Brown, 1942), 2:77.

22. Hartog, *Saba,* 12–14; Morison, *Admiral* (abr.), 413; Morison, *Second Voyage,* 77; and Morison, *Southern Voyages,* 105.

23. On the problem of identification of the earliest names for the Leeward Islands, discovered by Columbus on his second voyage, see Lucius L. Hubbard, "Did Columbus Discover the Islands Antigua and St. Martin?" *Geographical Review* 21 (October 1931): 584–97; Morison, *Second Voyage,* 42, 63, 74; and Leonardo Olschki, "The Columbian Nomenclature of the Lesser Antilles," *Geographical Review* 33 (July 1943): 397–414.

24. Morison, *Admiral,* 2:77.

25. Olschki, "Nomenclature," 406.

26. Kahle, "Mapa de América," 170, has Santa Mardiya. Kahle, "Lost Map," 629; and Kahle, *Columbus-Karte von 1498,* 22, 51, have Santa Mardia. Konyali, *Topkapi Sarayinda,* 108, reads it as Santa Maroye and suggests it is the Santa Maria Redonda of Columbus, modern Redonda.

27. Kahle, "Lost Map," 628.

28. Olschki, "Nomenclature," 397–414.

29. Antonio Ballesteros Beretta, *Cristóbal Colón y el descubrimiento de América,* vol. 5 of *Historia de América* (Barcelona: Salvat Editores, S.A., 1945), 753; and Kahle, "Mapa de América," 170, give Marviye Galanda.

30. Morison, *Journals,* 211.

31. Morison, *Admiral,* 2:76–77 n. 16; James Carson Brevoort, "Notes on Giovanni da Verrazano and on the Planisphere of 1529 Illustrating His American Voyage in 1524," *Bulletin of the American Geographical Society* 4 (1872): 239; Clarence H. Haring, *Trade and Navigation between Spain and the Indies in the Time of the Hapsburgs,* vol. 19 of *Harvard Economic Studies* (Cambridge: Harvard University Press, 1918), 223–25; and Morison, *Admiral* (abr.), 404.

32. Denucé, "South America," 80; Hubbard, "Antigua," 588; Edward Luther Stevenson, *Marine World Chart of Nicolo de Canerio Januensis 1502 (Circa)* (New York: Hispanic Society of America, 1908), 86; Harrisse, *North America,* pl. 19, 768. Although the Turin map, one of the few Spanish maps of the first half of the sixteenth century to survive, is dated c. 1523, later than the Piri Reis map under consideration, it is important because it preserves a much older nomenclature than its date may indicate. See Harrisse, *North America,* 528–33.

33. Kahle, *Columbus-Karte von 1498,* 21–22, 51; Kahle, "Lost Map," 628; and Kahle, "Mapa de América," 170.

34. Reguera Sierra, "Piri Reis," 44–45; Ballesteros Beretta, *Cristóbal Colón,* 753; Almagià, "Mappamondo," 449. Almagià, "World Map," 198, suggests an alternative reading of Usita.

35. Martinique, known to Columbus as Matinino, is probably the island he visited on his fourth voyage.

36. Sauer, *Spanish Main,* 193.

37. Harrisse, *North America,* 770.

38. Hubbard, "Antigua," 588; Morison, *Second Voyage,* 37 n. 2; and Olschki, "Nomenclature," 399 n. 10.

39. Francis Augustus MacNutt, ed., *De Orbe Novo: The Eight Decades of Peter Martyr d'Anghiera,* 2 vols. (1912; reprint, New York: Burt Franklin, 1970), 1:391; and Pedro Mártir de Angleria, *Décadas del Nuevo Mundo* (1530; reprint, Buenos Aires: Editorial Bajel, 1944), 284. Richard Eden, in his translation of Martyr into English in 1555, apparently misread "nombre nuevo" for "hombres nuestros" and therefore mistranslated "que con nombre nuevo se llama Deseada," i.e., "which with the new name called Deseada," as "which our men named Desiderata." See Richard Eden, *The Decades of the Newe World or West India,* translation of *De rebus oceanicis et orbe novo decades,* by Pietro Martire d'Anghiera, and other works (1555; reprint, Ann Arbor, Mich.: Readex Microprint, 1966), 138v.

40. Morison, *Admiral* (abr.), 512–13; and Morison, *Southern Voyages,* 143–45.

41. Desmond V. Nicholson, *Place Names in Antigua and Barbuda* (Antigua Archeological and Historical Society, 1984), 1; and Desmond V. Nicholson, *The Story of the Arawaks in Antigua and Barbuda* (Antigua Archeological Society, 1983), 29.

42. Nicholson, *Arawaks,* 29; and Nicholson, *Place Names,* 1.

43. Robert Booth, "Dominica," *National Geographic Magazine* 177 (June 1990): 107.

44. First recorded by the French as Oualie, the "wa-" sound being written as *oua-,* just as the French word *oui,* for yes, is pronounced "wee." See Nicholson, *Arawaks,* 29; and Ivor Walters, "A Short History of Nevis," in *St. Christopher and Nevis Independence Magazine, 19th September 1983* (1983), 17.

45. Kahle, "Lost Map," 628; and Morison, *Admiral* (abr.), 409.

46. Kahle, *Columbus-Karte von 1498,* 21, 51; Kahle, "Lost Map," 628; Kahle, "Mapa de América," 170; Konyali, *Topkapi Sarayinda,* 107; Morison, *Admiral,* 2:77; and Reguera Sierra, "Piri Reis," 45.

47. Harrisse, *North America,* 756; and Sauer, *Spanish Main,* 192.

48. Akçura, *Piri Reis Haritasi,* fold-out map, has Kalevot. Kahle, *Columbus-Karte von 1498,* 23, 52; Kahle, "Lost Map," 628–29; and Reguera Sierra, "Piri Reis," 44, read it as Kalewot. Almagià, "Mappamondo," 445 n. 2; and Almagià, "World Map," 195 n. 2, alternatively suggest Qalawut. Morison, *Admiral,* 2:77, has Kalevut; Morison, *Admiral* (abr.), 408, has Kalewat; Ballesteros Beretta, *Cristóbal Colón,* 753, gives Kalewoth; and Afetinan, *Life and Works,* 36, gives it as Kalerot.

49. Morison, *Second Voyage,* 17 n. 2. Some other forms of the name are Karukera,

Caracueira, Caraquiera, Carqueixra, Carqueira, Kerkeria, Quiqueri, Quaris, Quariqui, and Turuqueira. See Jane, *Four Voyages*, 1:30; MacNutt, *Orbe Novo*, 1:72, 390, 2:427, 433; Morison, *Admiral*, 2:76–77 n. 16; and Morison, *Admiral* (abr.), 409.

50. Kahle, *Columbus-Karte von 1498*, 23–24, 52; Kahle, "Columbus-Karte von Amerika," 248; Kahle, "Lost Map," 628–29; Kahle, "Mapa de América," 170; and Kahle, "Turkish Sailor," 106–7.

51. Pierre-Gustave-Louis Borde, *The History of Trinidad under the Spanish Government*, trans. James Alva Bain (1876; reprint, Port-of-Spain, Trinidad: Paria, 1982), 1:25; Morison, *Journals*, 268 n. 1; and Louis Antoine Aimé Gaston de Verteuil, *Trinidad: Its Geography, Natural Resources, Administration, Present Condition, and Prospects* (London: Ward and Lock, 1858), 81. See also E. L. Joseph, *History of Trinidad* (1838; reprint, London: Frank Cass, 1970), 3, for an example of the confusion as to whether the landfall of Columbus was Punta Galera or Punta Galeota and whether it was the northeast or southeast point of Trinidad.

52. Ramsay, *No Longer*, 177–78.

53. Bernard G. Hoffman, *Cabot to Cartier: Sources for a Historical Ethnography of Northeastern North America, 1497–1550* (Toronto: University of Toronto Press, 1961), 91.

54. A. Afetinan, "Un Amiral, Geographe Turc du XVI siècle Piri Reis, auteur de la plus ancienne carte de l'Amerique," *Belleten* 1 (April 1937): 344; Afetinan, *Life and Works*, 62; and Afetinan, *Oldest Map*, 27; H. Bibicou, "Sources byzantines pour servir a l'histoire maritime," in *Les sources de l'histoire maritime en Europe, du Moyen Age au XVIII siècle*, ed. Michel Mollat (Paris: S.E.V.P.E.N., 1962), 134; Goodrich, "Portolans," 7; Konyali, *Topkapi Sarayinda*, 107; Tekeli, "Map of America," 675, 680; and Yerci, "World Map," 155.

55. Marvel, "Lucaiarum," 25.

56. Kahle, "Lost Map," 629.

57. George E. Nunn, *Origin of the Strait of Anian Concept* (Philadelphia: Privately printed, 1929), 4; and Marco Polo, *Travels*, 2:272.

58. Smithsonian Institution, *Art Treasures of Turkey*, 103.

59. Kahle, *Columbus-Karte von 1498*, 23; and Kahle, "Lost Map," 629.

CHAPTER NINE *Hispaniola and the Bahamas*

1. Almagià, "Mappamondo," 446; and Almagià, "World Map," 196, reads it as *Gesire [. . .] destan*. Kahle, *Columbus-Karte von 1498*, 24, reads it as *Izle stania*. Josiah Marvel (personal communication) reads it as *elcezire yizladizpanya*.

2. Dunn and Kelley, *Diario*, 214–15.

3. In his letter of 20 October 1494.

4. Marvel, "Lucaiarum," 25.

5. Kahle, "Turkish Sailor," 107, instead identifies this castle as Navidad.

6. The identification of *Paksin vidad* as Navidad was first made by Josiah Marvel (personal correspondence).

7. See Samuel Eliot Morison, "The Route of Columbus along the North Coast of Haiti, and the Site of Navidad," *Transactions of the American Philosophical Society,* n.s., 31, pt. 4 (1940): 263. Manzano Manzano, *Pinzónes,* 1: pl. 15 opp. p. 396, reads the place-name on the La Cosa map as *nabidat.*

8. For a similar instance of a Columbian place-name "migrating" on a map from one coast to another, in this case, Cuba, see Nunn, *Geographical Conceptions,* 121–22, 127. See also Morison, *Southern Voyages,* 109n.

9. Dilke, *Maps,* 81, 86.

10. G. E. Gerini, *Researches on Ptolemy's Geography of Eastern Asia (Further India and Indo-Malay Archipelago),* Asiatic Society Monograph, no. 1 (London: Royal Asiatic Society and Royal Geographical Society, 1909), 2, 302–4.

11. Luciano Formisano, *Letters from a New World: Amerigo Vespucci's Discovery of America,* trans. David Jacobson (New York: Marsilio, 1992), 171 n. 7. See also Pohl, *Vespucci,* 211.

12. George E. Nunn, "Marinus of Tyre's Place in the Columbus Concepts," *Imago Mundi* 2 (1937): 31.

13. Kahle, *Columbus-Karte von 1498,* 24, 52; Kahle, "Lost Map," 630; and Kahle, "Turkish Sailor," fold-out map opp. p. 100, 107.

14. The site of Isabela became known as Isabela Vieja, i.e., Old Isabela.

15. Kathleen A. Deagan, "La Isabela, Europe's First Foothold in the New World," *National Geographic Magazine* 181 (January 1992): 45.

16. See also Almagià, "Mappamondo," 446; and Almagià, "World Map," 196.

17. Kahle, "Mapa de América," 171. Ballesteros Beretta, *Cristóbal Colón,* 753, repeats this error.

18. *Semana* is also Spanish for "week."

19. Keen, *Columbus,* 56–57.

20. Giuseppe Ferraro, *Relazione delle scoperte fatte da C. Colombo, da A. Vespucci e da altri dal 1492 al 1506* (Bologna: Presso Gaetano Romagnoli, 1875), pl. 37.

21. Dunn and Kelley, *Diario,* 273, 285, 307; and Keen, *Columbus,* 56.

22. "Quã hispani spagnolã vocant sipangu." See Harrisse, *North America,* 113; and Fite and Freeman, *Old Maps,* 30.

23. Donald L. McGuirk Jr., "Ruysch World Map: Census and Commentary," *Imago Mundi* 41 (1989): 138. Another direct influence of the Ruysch map of 1507–8 upon Fine's map is seen in the latter's copying of Ruysch's Arctic delineation.

24. Paul Graf Teleki, *Atlas zur Geschichte der Kartographie der Japanischen Inseln. Nebst dem hollaendischen Journal der Reise Mathys Quasts und A. J. Tasmans zur Entdeckung der Goldinseln im Osten von Japan i. d. J. 1639 und dessen deutscher Uebersetzung* (1909; reprint, Nendeln, Liechtenstein: Kraus, 1966), 14.

25. Dunn and Kelley, *Diario,* 273, 285, 307; and Morison, *Journals,* 111 n. 5.

26. Kelley, "Columbus's Navigation," 6–9.

27. Hapgood, *Sea-Kings,* 38 fig. 18; and Levillier, *América,* 1:106.

28. Hapgood, *Sea-Kings,* 193–206.

29. Ibid., 1 n. 2, 292.

30. The harbor at the mouth of the Río Ozama, ten miles to the east of the Río Haina, was the eventual site of the settlement. See Sauer, *Spanish Main*, 92.

31. The first Spanish ship to have sailed into the Golfe de la Gonâve on the western side of Hispaniola may have been that dispatched by Columbus in late 1493 or early 1494 to circumnavigate Hispaniola, although the fate of this caravel is unknown. See Jane, *Four Voyages*, 1:42. The next Spanish ships to sail to western Hispaniola were those under Alonso de Hojeda (Ojeda) toward the end of 1499. The complete outline of Hispaniola, including the Golfe de la Gonâve, is depicted on the Juan de la Cosa map of 1500 (or later). According to Peter Martyr, however, the first map of Hispaniola to depict the Golfe de la Gonâve was that of 1508 by Andrés de Morales. See Sauer, *Spanish Main*, 41.

32. The route of John Cabot's first voyage of 1497, according to Samuel Eliot Morison, *The European Discovery of America: The Northern Voyages, A.D. 500–1600* (New York: Oxford University Press, 1971), 178–79, was north-south along the east coast of Newfoundland, but is depicted on the La Cosa map as being east-west.

33. Henry Harrisse, *La découverte et évolution cartographique de Terre-Neuve et des Pays Circonvoisins, 1497–1501–1769* (Paris: H. Welter; London: Henry Stevens, Son and Stiles, 1900), 54–55; and Hoffman, *Cabot to Cartier*, 79–81.

34. George E. Nunn, *The La Cosa Map and the Cabot Voyages: Was New York Bay Discovered by John Cabot, 1498?* Tall Tree Library, no. 19 (Jenkintown, Penn.: Privately printed, 1946), 12–13.

35. W. A. R. Richardson, *The Portuguese Discovery of Australia: Fact or Fiction?* Occasional Lecture Series, no. 3 (Canberra: National Library of Australia, 1989), 5–28.

36. James E. Kelley Jr., "The Vopel Gores of 1536 and Other Mappa Mundi Showing America in the Early Sixteenth Century" (typescript, Menlo Park, Penn., 1975), 11.

37. Hoffman, *Cabot to Cartier*, 79–80.

38. Mollat du Jourdin and La Roncière, *Sea Charts*, 228, 238.

39. A possibly similar relationship may also apply to the depiction of zipagu, i.e., Cipangu, on the Chatsworth sheet of c. 1525, which seems to exhibit some of the same coastal features as those of Hispaniola on the Piri Reis map, the Cantino map, the Canerio map, and the Bordone depiction. See Rodney W. Shirley, *The Mapping of the World*, 2d ed. (London: Holland Press, 1987), no. 55.

40. MacNutt, *Orbe Novo*, 1:363; and Sauer, *Spanish Main*, 41–44.

41. Kahle, "Lost Map," 630, 632–3; Marvel, "Lucaiarum," 25; Morison, *Second Voyage*, 18; and Smithsonian Institution, *Art Treasures*, 103.

42. Akçura, *Piri Reis Haritasi*, fold-out map, has *Brebeniş*. Kahle, "Turkish Sailor," fold-out map opp. p. 100, reads *Brabanisha*.

43. Keen, *Columbus*, 144; and Morison, *Southern Voyages*, 133.

44. Kahle, "Turkish Sailor," fold-out map opp. p. 100, reads *Bas Bakosa*. A reading of this place-name is not given in Kahle's earlier works on the Piri Reis map.

45. Jaime Cortesão, *Os Descobrimentos Portugueses*, 2 vols. (Lisbon: Arcadia, 1960–62), 1:259–62; Cortesão, *Portuguese Cartography*, 2:133; Cortesão and Teixeira da Mota,

Portugaliae Monumenta Cartographica, 1:xxxiii; and R. A. Skelton, Thomas E. Marston, and George D. Painter, *The Vinland Map and the Tartar Relation* (New Haven: Yale University Press, 1965), 158.

46. Cortesão, *Portuguese Cartography*, 1:133. Skelton, Marston, and Painter, *Vinland Map*, 158, defines *baga* as "weed."

47. Marvel, "Lucaiarum," Table of Reference Points.

48. Ibid., 25.

49. Almagià, "World Map," 196; and Kahle, "Lost Map," 636–37, read the name as *Tris Matos*.

50. Kahle, "Lost Map," 636; and Marvel, "Lucaiarum," 25.

51. Marvel, "Lucaiarum," 15. This Spanish definition asserted by Marvel has not been substantiated by the author of the present work.

52. Kahle, *Columbus-Karte von 1498*, 40 n. 1.

53. Josiah Marvel, "On the First Landfall of Christopher Columbus in the New World: Textual and Cartographic Evidence Supporting the Hypothesis That It Took Place on Grand Turk Island" (typescript, Providenciales, Turks and Caicos Islands, British West Indies, 1990), 68.

54. Donald L. McGuirk Jr., "The Island of Triango on Early Maps" (paper presented at the twenty-ninth annual meeting of the Society for the History of Discoveries, San Francisco, 9 June 1989).

55. Ralph S. Boggs, Lloyd Kasten, Hayward Keniston, and H. B. Richardson, comps., *Tentative Dictionary of Medieval Spanish*, 2 vols. (Chapel Hill, N.C., 1946), s.v. "mata"; Arturo Cuyás, *Appleton's New English-Spanish and Spanish-English Dictionary*, 3d ed., rev. and enl. by Antonio Llano (New York: Appleton-Century-Crofts, 1943), s.v. "mata"; Henry Neuman, *A New Dictionary of the Spanish and English Languages; Wherein the Words Are Explained Agreeable to Their Different Meanings, and a Great Variety of Terms Relating to the Arts, Sciences, Trade, and Navigation, Carefully Elucidated* (London: Vernon and Hood, J. Sewell, Cuthell and Martin, J. Walker, T. Boosey, Lackington, Allen and Co., R. Lea, Otridge and Son, Ogilvy and Son, and J. Nunn, 1802), s.v. "mata"; Victor R. B. Oelschläger, *A Medieval Spanish Word-List* (Madison: University of Wisconsin Press, 1940), s.v. "mata"; Eugene Lyon, "Search for Columbus," *National Geographic Magazine* 181 (January 1992): 20; and Dunn and Kelley, *Diario*, 89, 135, 145, 155, 215, 217, 225, 307, 309, 315, 341.

56. Henry Kahane, Renée Kahane, and Andreas Tietze, *The Lingua Franca in the Levant: Turkish Nautical Terms of Italian and Greek Origin* (Urbana: University of Illinois Press, 1958), 544.

57. Almagià, "Mappamondo," 446; Almagià, "World Map," 196; Kahle, "Turkish Sailor," fold-out map opp. p. 100; Marvel, "First Landfall," 38; Marvel, "Lucaiarum," 25; and others who accepted Kahle's conclusions, such as Konyali, *Topkapi Sarayinda*, 109, wherein this place-name is mistakenly transliterated as *Barbuda*.

58. On the origin and meaning of this and other Taino place-names, see Julian Granberry, "Lucayan Toponyms," *Journal of the Bahamas Historical Society* 13 (October 1991): 3–12, esp. 10.

59. Judge, *Casebook*, 63; Morison, *Southern Voyages*, 214; and Martín Fernández de Navarrete, *Colección de los viages y descubrimientos que hicieron por mar los Españoles desde fines del siglo xv*, 5 vols. (1825–37; reprint, Buenos Aires: Editorial Guarania, 1945), 3:40, 559.

60. According to Dr. Eugene Lyon in *Miami Herald*, "Is Shipwreck Columbus' Pinta?" 12 October 1980.

61. Cited in Josiah Marvel, "The First Independent Voyage of Vicente Yáñez Pinzón," *HRD News* 2 (January–February 1990): 8, 10 n. 16, from Navarrete, *Colección*, 3:576. See also Marvel, "Lucaiarum," 30.

62. Navarrete, *Colección*, 3:554; and Antonio Muro Orejón, ed., *Pleitos colombinos*, 4 vols. (Sevilla: Escuela de Estudios Hispano-Americanos, 1964–89), 1:139.

63. Cited by Harrisse, *North America*, 758, from Navarrete, *Colección*, 3:570–71.

64. According to Dr. Eugene Lyon in *Miami Herald*, "Is Shipwreck Columbus' Pinta?" 12 October 1980.

65. Gregory C. McIntosh, "Martín Alonso Pinzón's Discovery of Babueca and the Identity of Guanahani," *Terrae Incognitae* 24 (1992): 79–100.

66. Almagià, "Mappamondo," 446; and Almagià, "World Map," 196, gives it as Ileusda. Marvel, "Lucaiarum," 25, transliterates it as Isla Verde.

67. E. G. R. Taylor, review of *The Cabot Voyages and Bristol Discovery under Henry VII*, by J. A. Williamson, *Geographical Review* 129 (September 1963): 340, equates this island of *Ile verde* on the Piri Reis map with the Ysla Verde in the North Atlantic on the La Cosa map. Then, apparently confusing inscription no. 7, located in South America, as a remark about *Ile verde*, Taylor states that the Piri Reis map gives the latitude of *Ile verde* in terms that make it to be near Cape Chidley in northern Labrador. This convoluted and confused argument is used by Taylor to support her contention that John Cabot sailed to Cape Chidley in 1497.

68. Lunde, "Piri Reis," 24, repeating a suggestion of Gregory C. McIntosh, "Columbus and the Depiction of the West Indies on the Piri Reis map of 1513" (paper read at the twenty-fifth annual meeting of the Middle East Studies Association of North America, Washington, D.C., 26 November 1991), thinks that *Ile verde* may be the legendary Ile Verde sometimes shown in the Atlantic on medieval portolan charts, although its location in the Bahamas on the Piri Reis map makes this seem unlikely. Josiah Marvel (personal correspondence, 7 July 1990) suggests the original Spanish name was tierra verde, "a green land," possibly denoting the Caicos Islands, which are greener than the nearby Turks Islands, to support the contention that Columbus sailed to the Turks and Caicos Islands in 1492.

69. Dunn and Kelley, *Diario*, 113. Konyali, *Topkapi Sarayinda*, 111, identifies *Ile verde* as Fernandina, perhaps for the same reason.

70. McIntosh, "Pinzón's Discovery of Babueca."

71. Kahle, "Lost Map," 637, has *Tersiosa*. Kahle, *Columbus-Karte von 1498*, 40, 52, has *Tersioza*. Konyali, *Topkapi Sarayinda*, 111, identifies this island as the modern San Salvador (formerly Watling Island).

72. Josiah Marvel (personal correspondence, 7 July 1990).

73. Dunn and Kelley, *Diario*, 105, 107.

74. Morison, *Admiral* (abr.), 593; and Samuel Eliot Morison and Mauricio Obregón, *The Caribbean as Columbus Saw It* (Boston: Little, Brown, 1964), 230–31.

75. Dunn and Kelley, *Diario*, 199.

76. Almagià, "Mappamondo," 446; and Almagià, "World Map," 196, transliterates it as either *San Dani* or *San Dafai*. Kahle, "Turkish Sailor," fold-out map opp. p. 100, gives *Sandany*.

77. Dunn and Kelley, *Diario*, 208, 212; Morison, *Admiral* (abr.) 278, 679; and Morison, *Southern Voyages*, 75–76. Curiously, Harrisse, *North America*, 774, identifies Cabo de S. Nicolao with Punta de Mayci (Cabo Maisi), the eastern end of Cuba, fifty miles across the Windward Passage from Môle St. Nicolas. The first suggestion that *Sandani* is from Santo Ni or Sant Nicolas was made by Josiah Marvel (personal communication, 7 July 1990).

78. Dunn and Kelley, *Diario*, 212–13.

79. Ibid., 193n.

80. Morison, *Journals*, 224.

81. G. R. Crone, *The Discovery of America* (New York: Weybright and Talley, 1969), 206.

82. Hapgood, *Sea-Kings*, 38.

83. Kahle, "Mapa de América," 171. Konyali, *Topkapi Sarayinda*, 111, identifies this island as the one named Isabela by Columbus and Saometo by the Taino.

CHAPTER TEN *Cuba and Central America*

1. Afetinan, *Life and Works*, 37; Kahle, "Lost Map," 630–32; and Afetinan, *Oldest Map*, 37. Although Almagià, "Mappamondo," 447, correctly stated that Cuba was *not* shown as an island on the Piri Reis map, this was mistranslated in Almagià, "World Map," 196, to state the opposite—that on the map Cuba was shown as an island!

2. Dunn and Kelley, *Diario*, 125, 201.

3. Morison, *Admiral* (abr.), 446–47, 465–66; and Morison, *Journals*, 223.

4. Jane, *Four Voyages*, 2:94–95 n. 2; 2:122–23 n. 2; Morison, *Admiral* (abr.), 458; and Morison, *Journals*, 379–80 n. 1.

5. Konyali, *Topkapi Sarayinda*, 111, reads this as *Istonasid* and identifies it with present-day Cat Island in the Bahamas. Lunde, "Piri Reis," 24, reads *istunasid*.

6. Josiah Marvel (personal communication, 7 July 1990). Lunde, "Piri Reis," 24, repeating a suggestion by McIntosh, "West Indies," thinks that *istunasid* (or *Istonasia*) may be a variant of Santanazares (Santanaxes), a medieval legendary island of the Atlantic.

7. Kahle, "Lost Map," 631. Kahle, *Columbus-Karte von 1498*, 29, has *Porta Ghanda*. Kahle, *Columbus-Karte von 1498*, 52, has *Porta ġande*. Akçura, *Piri Reis Haritasi*, fold-out map, has *Portafande*.

8. Jane, *Four Voyages*, 1:120 and n.; and Morison, *Southern Voyages*, 124.

9. Kahle, *Columbus-Karte von 1498*, 29; and Kahle, "Lost Map," 631. Akçura, *Piri Reis*

Haritasi, fold-out map, reads it as Kavpunta Arofi. Almagià, "World Map," 196 n. 4, suggests Kaw Punta Aruni or Arufi or Arufay. Crone, *Discovery*, 209; and Kahle, *Columbus-Karte von 1498*, 52, have kaw punta orofai.

10. Jane, *Four Voyages*, 1:138, 156–57; Kahle, "Lost Map," 631; and Morison, *Admiral* (abr.), 458. Jane, *Four Voyages*, 1:184, gives an alternate spelling of Ornophay. Morison, *Admiral* (abr.), 458, identifies Ornofay as the region about the mouth of present-day Rio San Juan near Cienfuegos on the south coast of Cuba. Donald L. McGuirk Jr. (personal communication, 1990) has suggested that the name Arofi on this coast may have originally been Arõphi, or Aromphi, this name being in a similar location on the coast of East Asia on the Ruysch map of 1507–8. That name there, however, relates to the Arctic regions. See McGuirk, "Ruysch Map: Census," 137–38, 141.

11. Almagià, "Mappamondo," 446; and Almagià, "World Map," 196, transliterate this name as *Sant Marie*. Kahle, "Mapa de América," 171, has *Santa Mariya*.

12. Keen, *Columbus*, 138. See also Irving, *Columbus*, 1:260.

13. Harrisse, *North America*, 86.

14. Jane, *Four Voyages*, 1:135 n. 3, 137 n. 3, 143 n. 2.

15. Almagià, "Mappamondo," 447 n. 1; Almagià, "World Map," 196 n. 4; and J. M. Cohen, ed. and trans., *The Four Voyages of Christopher Columbus* (New York: Penguin Books, 1969), map opp. p. 169; Jane, *Four Voyages*, 1: map following p. 114, 135 n. 3.

16. Morison, *Journals*, 404.

17. Keen, *Columbus*, 137; and Morison, *Admiral* (abr.), map opp. p. 458.

18. Jane, *Four Voyages*, 1:4; Morison, *Journals*, 182; and Nunn, *Geographical Conceptions*, 112.

19. The *Diario*, or Log, of the first voyage of Columbus, as it has come down to us, is a thirdhand abstract summarizing much of the lost original and containing many copyists' errors, but also containing many passages quoted verbatim from the original logbook. See Dunn and Kelley, *Diario*, 3–14; Robert H. Fuson, "The *Diario de Colón*: A Legacy of Poor Transcription, Translation, and Interpretation," *Terrae Incognitae* 15 (1983): 51–75; and David Henige, *In Search of Columbus: The Sources for the First Voyage* (Tucson: University of Arizona Press, 1991), 3–4.

20. Dunn and Kelley, *Diario*, 129.

21. Dunn and Kelley, *Diario*, 125; Robert H. Fuson, *The Log of Christopher Columbus* (Camden, Maine: International Marine, 1987), 98; and Nunn, *Geographical Conceptions*, 112.

22. Nunn, *Geographical Conceptions*, 102. See also Harrisse, *North America*, 403.

23. Morison, *Journals*, 221, 223.

24. Morison, *Admiral* (abr.), 464–65.

25. Harrisse, *North America*, 85.

26. Nunn, *Geographical Conceptions*, 102; and Stevens, *Notes*, 12.

27. Crone, *Discovery*, 209. Similarly, Stevens, *Notes*, 13n, states that the south coast of Cuba on the Ruysch map is a literal copy of the same coast on the La Cosa.

28. Akçura, *Piri Reis Haritasi*, fold-out map.

29. Almagià, "Mappamondo," 197n. Kahle, *Columbus-Karte von 1498,* table 2, has *Ile tarsomania.*

30. Jane, *Four Voyages,* 1:150. El Teroneso is apparently from *terronazo,* Spanish for "dirt clod."

31. Without suggesting a specific island, Konyali, *Topkapi Sarayinda,* 111–12, also infers that *Ile Tarsumanye* is among the many islands on the south coast of Cuba discovered by Columbus on his second voyage.

32. Harrisse, *North America,* 81–82; Keen, *Columbus,* 266–67; and Sauer, *Spanish Main,* 125.

33. Morison, *Southern Voyages,* 243.

34. Harrisse, *North America,* 769. Other early names for Jamaica were Xaymaca, Xamaica, Yamaye, Lamahich, Zamascha, and Aomaquique. See Denucé, "South America," 80; Keen, *Columbus,* 267, 271; Morison, *Journals,* 146, 222, 225 n. 9; and Morison and Obregón, *Caribbean,* 229.

35. Lunde, "Piri Reis," 24. Akçura, *Piri Reis Haritasi,* fold-out map, has *feridat Kalai.* Almagià, "Mappamondo," 447 n. 2; and Almagià, "World Map," 197 n. 1, suggests a doubtful reading of *Qal'ah-i-Unara.*

36. This misinterpretation of this place-name by Piri Reis might possibly have been influenced by the well-known religious and philosophical adjudication *al-Durrah al-Fākhirah,* i.e., "The Precious Pearl," completed in 886 A.H. (1481 C.E.) by the Persian scholar Nūr al-Dīn 'Abd al-Rahmān ibn Ahmad al-Jāmī. See Nicholas Heer, trans. and ed., *The Precious Pearl: Al-Jāmī's Al-Durrah Al-Fakhirah Together with His "Glosses" and the "Commentary" of 'Abd al-Ghafūr al-Lārī* (Albany: State University of New York Press, 1979).

37. Veragua may have originally been the name or title of the ruler of the region; see Sauer, *Spanish Main,* 132. It also became the title—duke of Veragua—given to the heirs of Columbus. See Morison, *Admiral* (abr.), 609.

38. Although Columbus's Genoese origin was asserted by himself, members of his family, some contemporary writers, and even Piri Reis, many modern scholars have questioned his nationality.

39. Denucé, "South America," 70, 73, 77; David W. Tilton, "Yucatán on the Peter Martyr Map?" *Terrae Incognitae* 21 (1989): 17–25; and the citations in the "Geographical Index" in Harrisse, *North America,* 755–84.

40. Denucé, "South America," 71, suggested the castle or fortress denoted by *castello veragua* on the Egerton MS 2803, fol. 8r map is to recall a planned colony by Diego Nicuesa.

41. *Oxford English Dictionary,* s.v. "baroque."

42. C. L. G. Anderson, *Old Panama and Castilla del Oro* (Washington: Sudwarth, 1911), 2. Thirty years later, the same author, Charles L. G. Anderson, *Life and Letters of Vasco Núñez de Balboa, Including the Conquest and Settlement of Darien and Panama, the Odyssey of the Discovery of the South Sea, a Description of the Splendid Armada to Castilla del Oro and the Execution of the Adelantado at Acla: A History of the First Years*

of the Introduction of Christian Civilization on the Continent of America (London: Fleming H. Revell, 1941): 139, 219, 225, implied that the earliest usage of the name Castilla del Oro was in 1513. If the name castello veragua on the Egerton MS 2803 map is from these two place-names for neighboring regions in Panama—Castilla and Veragua, or Castillo y Veragua—then this definitely dates the Egerton map later than the 1508 date often suggested for it.

43. Harrisse, *North America*, 420, 431; and Björn Landström, *Columbus* (New York: Macmillan, 1967), 177.

44. Fernández Duro, *Pleitos*, 1:182–85.

45. Nunn, *Roselli*, 8–12, 19–23.

46. Jane, *Four Voyages*, 2:80 n. 3; and Nunn, *Roselli*, 19.

47. Harrisse, *North America*, 566–67.

48. Landström, *Columbus*, 177; MacNutt, *Orbe Novo*, 1:271, 329–30; Morison, *Journals*, 379, 380 n. 1; and Nunn, *Roselli*, 20.

49. Harrisse, *North America*, 97–98.

50. Kahle, "Lost Map," 634.

51. The Zorzi maplets, although they do not depict Cuba, are omitted from consideration because it is likely that Cuba was omitted from the map-sketch because there was not sufficient room in the margin of the Zorzi Letter.

52. On the attempts in early sixteenth-century cartography to reconcile the New World geography with the geography of East Asia, see Johann Georg Kohl, "Asia and America: An Historical Disquisition Concerning the Ideas Which Former Geographers Had About the Geographical Relation and Connection of the Old and New World," *Proceedings of the American Antiquarian Society*, n.s., 21 (October 1911): 284–338; Nunn, *Anian Strait;* George E. Nunn, *The Columbus and Magellan Concepts of South American Geography* (Glenside, Penn.: Privately printed, 1932); Nunn, *Geographical Conceptions*, 54–141; Nunn, *Roselli;* George E. Nunn, "The Three Maplets Attributed to Bartholomew Columbus," *Imago Mundi* 9 (1952): 12–22; and Errol Wayne Stevens, "The Asian-American Connection: The Rise and Fall of a Cartographic Idea," *Terrae Incognitae* 21 (1989): 27–39.

53. This inscription, though transliterated in Akçura, *Piri Reis Haritasi*, fold-out map, was not translated. The translation is from Afetinan, *Oldest Map*, 28.

54. Harry Kelsey, "The Planispheres of Sebastian Cabot and Sancho Gutiérrez," *Terrae Incognitae* 19 (1987): 44.

55. The name on the map, Province of Antilia, is similar to the Province of America on the Apianus map of 1520 and may indicate some relationship. See Stevenson, "Waldseemüller," 210.

56. Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica*, 1:11; and Morison, *Journals*, 177n.

57. On the subject of legendary islands, major references are Babcock, *Legendary Islands;* Cortesão, *Nautical Chart of 1424;* Cortesão, *Portuguese Cartography*, 125–39; Fuson, *Legendary Islands;* Rupert T. Gould, *Oddities: A Book of Unexplained Facts* (1928; reprint, New York: Paperback Library Edition, 1969), 165–214; Donald S. Johnson,

Phantom Islands of the Atlantic (Fredericton, N.B., Canada: Goose Lane, 1994); Ramsay, *No Longer;* Stommel, *Lost Islands;* and Thomas Johnson Westropp, "Brasil and the Legendary Islands of the North Atlantic: Their History and Fable. A Contribution to the 'Atlantis' Problem," *Proceedings of the Royal Irish Academy* 30, sec. C, no. 8 (1912): 223–60.

58. Morison, *Admiral* (abr.), 347; Morison, *Journals,* 177; and Ruy de Pina, *Chronica d'El Rei Dom João II,* no. 4 in vol. 2 of *Colleçcão de Livros Inéditos de História Portugueza,* ed. José Corrêa da Serra (Lisbon: Academia Real das Sciencias, 1792), 2:177–78.

59. Harrisse, *North America,* 108–9; and Nunn, *Geographical Conceptions,* 131. Also, sometime between 1505 and 1520, Duarte Pacheco Pereira of Portugal wrote that the new continent was one landmass extending from beyond 70° N (Baffin Bay) to beyond 28½° S (southern Brazil). See Greenlee, *Cabral,* lii.

60. Stevens, "Asian-American Connection," 27–39.

61. Cortesão and Teixeira da Mota, *Portugaliae Monumenta Cartographica,* 1:12; Marvel, "Lucaiarum," 12; Morison, *Southern Voyages,* 273–74; and Stevenson, *Canerio,* 39.

62. The quotation is found in Eden, *Decades of the Newe World,* 2v, but the spellings have been modernized. Babcock, *Legendary Islands,* 145, suggests that instead of descriptions in words, perhaps delineations on maps were meant. See also Ramsay, *No Longer,* 197.

63. Formisano, *Letters from a New World,* 85; Mauricio Obregón, *Argonauts to Astronauts* (New York: Harper and Row, 1980), 117; Amerigo Vespucci, *The Soderini Letter 1504 in Facsimile,* vol. 2 of *Vespucci Reprints, Texts, and Studies* (Princeton, N.J.: Princeton University Press, 1916), 23; and Martin Waldseemüller, *Cosmographiae Introductio,* trans. Joseph Fischer and Franz von Wieser from the 1507 ed. (Ann Arbor, Mich.: Readex Microprint, 1966), 132.

64. William H. Babcock, "The Island of the Seven Cities," *Geographical Review* 7 (February 1919): 103; Babcock, *Legendary Islands,* fig. 8 opp. p. 74, 75, 147; Arthur Davies, "The Egerton MS 2803 Map and the Padrón Real of Spain of 1510," *Imago Mundi* 11 (1954): map opp. p. 47, map opp. p. 50; and Ramsay, *No Longer,* 123.

65. Babcock, "Seven Cities," 102 fig. 1, 103; Babcock, *Legendary Islands,* 74; and Cortesão, *Portuguese Cartography,* 1:131.

66. Arthur Davies, "The 'English' Coasts on the Map of Juan de la Cosa," *Imago Mundi* 13 (1956): 28; George E. Nunn, *The Mappemonde of Juan de la Cosa: A Critical Investigation of Its Date* (Jenkintown, Penn.: George H. Beans Library, 1934), 37; and Williamson, *Cabot Voyages,* 82.

67. Washburn, "Unknown Lands," 10.

68. Williamson, *Cabot Voyages,* 82, 85, 209, 228.

69. The literature on the identity of the mysterious northwest landmass on the Cantino map is quite large. Two works that cite all of the major references are Nunn, *Geographical Conceptions,* 91–141; and Clinton R. Edwards, "The Test of Time," in *The Geographical Conceptions of Columbus: A Critical Consideration of Four Problems,* by George E. Nunn (1924, reprint, with additions, Milwaukee: American Geographical Society Collection of the Golda Meir Library, University of Wisconsin, 1992), 181–88, 191–

95. A recent and particularly excellent study of the problem of this mysterious landmass is Donald L. McGuirk Jr., "The Depiction of Cuba on the Ruysch Map," *Terrae Incognitae* 20 (1988): 89–97. It is interesting to note that Harrisse, *North America*, 425, who believed the landmass represented Florida and the southeastern United States, and Nunn, *Geographical Conceptions*, 136–38, 141, who believed the landmass primarily represented Columbus's ideas of Cuba as the mainland of Asia—two irreconcilably opposed views—both believed that the depiction and nomenclature of this landmass on the Cantino map was the result of the cartographer's efforts to combine data from several voyages and documentary sources.

70. McGuirk, "Depiction of Cuba," 97.

71. Donald L. McGuirk Jr., "The Mystery of Cuba on the Ruysch Map," *Map Collector* 36 (September 1986): 40–41; and McGuirk, "Ruysch Map: Census," 137.

72. Nunn, *Geographical Conceptions*, 115–38.

73. Ibid., 123–24.

74. Ibid., 108–9.

75. Gregory C. McIntosh, "The Cantino Map and the Cartographic Evolution of the West Indies" (paper read at the thirty-fifth annual meeting of the Society for the History of Discoveries, Arlington, Tex., 4 November 1995).

76. Richardson, "Southern Continent," 67–98, esp. 81.

77. Kahle, "Columbus-Karte von Amerika," 248; Kahle, *Columbus-Karte von 1498*, 37–49; and Kahle, "Lost Map," 634–36.

78. Dunn and Kelley, *Diario*, 21, 41, 51, 175.

79. Harrisse, *North America*, 400–401.

80. Almagià, "Mappamondo," 448; and Almagià, "World Map," 197–99.

81. Reproduced in Afetinan, *Life and Works*, pl. 58; Afetinan, *Oldest Map*, 42; Afetinan, *Piri Reis'in Amerika Haritasi*, 47; Tekeli, "Map of America," 682; and Van de Waal, "Manuscript Maps," 90 fig. 1.

82. Heawood, "World-Map," 268; Almagià, "Mappamondo," 448; and Almagià, "World Map," 197–98.

CHAPTER ELEVEN *Conclusions*

1. Soucek, "Islamic Charting," 267.

2. Clinton R. Edwards, "The Origin and Significance of the 'Bartholomew Columbus Maplets'" (paper read at the thirty-second annual meeting of the Society for the History of Discoveries, Miami, 3 October 1992).

3. Marvel, "Lucaiarum," 25.

4. Brice, Imber, and Lorch, *Sea-Chart*, 5, 12–16 (unpaginated).

5. Afetinan, *Life and Works*, 17; Afetinan, *Oldest Map*, 15; and Bayat, *Kitab-i Bahriye*, 1:21.

6. Kahle, "Turkish Sailor," map opp. p. 100.

7. On the cartographic history of Terra Australis, or the Southern Continent, which persisted on European cartography until the late eighteenth century, see Robert Clancy,

"The Mapping of 'Terra Australis,'" *Map Collector* 55 (summer 1991): 10–15; Robert Clancy, *The Mapping of Terra Australis* (Macquarie Park, N.S.W., Australia: Universal Press, 1995); James Enterline, "The Southern Continent and the False Strait of Magellan," *Imago Mundi* 26 (1972): 48–59; Armand Rainaud, *Le continent austral: Hypothèses et découvertes* (Paris: Armand Colin, 1893); Ramsay, *No Longer*, 22–52; Richardson, "Southern Continent"; R. V. Tooley, *Maps of Antarctica*, Map Collectors' Series, no. 2 (London: Map Collectors' Circle, 1963); Helen Wallis, "Java la Grande: The Enigma of the Dieppe Maps," in *Terra Australis to Australia*, ed. G. Williams and A. Frost (Melbourne: Oxford University Press and the Australian Academy of the Humanities, 1988); Franz Ritter von Wieser, *Magalhâes-Strasse und Austral-Continent auf gen Globen des Johannes Schöner* (Innsbruck: Wagner, 1881); Glyndwr Williams and Alan Frost, "*Terra Australis:* Theory and Speculation," in *Terra Australis to Australia*, ed. G. Williams and A. Frost (Melbourne: Oxford University Press and the Australian Academy of the Humanities, 1988); and Wroth, "Pacific," 163–79.

8. The same errors of methodology, resulting in the misidentification of the "continent" of Jave-la-Grande on the Dieppe maps of the mid-sixteenth century, have been discussed by Richardson, *Australia*.

9. Excellent, detailed studies of both the origins of cartographic confusions by sixteenth-century mapmakers and the misinterpretations of these confusions by modern historians of cartography are contained in the recent writings of W. A. R. Richardson, which are listed in the bibliography.

10. Apparently, the only instances of the 1498 dating being rejected in favor of the 1496 dating: see Gregory C. McIntosh, "Christopher Columbus and the Piri Reis Map of 1513," *American Neptune* 53 (fall 1993): 290; Gregory C. McIntosh, "Christoph Kolumbus und die Piri-Re'is-Karte von 1513," *Cartographica Helvetica* 11 (1995): 41; Gregory C. McIntosh, "Columbus and the Depiction of Hispaniola and Cuba on the Piri Reis Map of 1513," *Portolan: Journal of the Washington Map Society* 25 (fall 1992): 18; and Smithsonian Institution *Art Treasures*, 103.

11. Harrisse, *North America*, 408–9; and Morison, *Southern Voyages*, 185, 194, 199.

12. Kahle, "Lost Map," 634. Kahle, "Turkish Sailor," 106–7, also asserted that this map was sent to Spain accompanying the letter Columbus had written in Jamaica on his third voyage in 1498. Kahle is mistaken. Columbus did not visit Jamaica on his third voyage, only on his second and fourth voyages. The famous letter to which Kahle refers, known as *Lettera Rarissima*, was written by Columbus in Jamaica on 7 July 1503 during the fourth voyage. See Morison, *Journals*, 371–72.

13. Harrisse, *North America*, 399–400, 402–3, 405–6, 408–10, 418–19, 436–37.

14. Kahle, "Columbus-Karte von Amerika," 248; Kahle, *Columbus-Karte von 1498*, 23; Kahle, "Lost Map," 628–29; and Kahle, "Mapa de América," 170.

15. Akçura, *Piri Reis Haritasi*, map opp. p. 25.

16. Lunde, "Piri Reis," 20.

17. Although the surviving Juan de la Cosa map is a compilation, probably made sometime between 1501 and 1510, its depiction of the Western Hemisphere appears to be a copy of the original La Cosa map of 1500.

18. Haring, *Trade and Navigation,* 223–25.

19. Piri Reis, *Kitab-i Bahriye* (1988), 197.

20. Harrisse, *North America,* 403, 405–6, 670.

21. See Albert L. F. Rivet, "Ptolemy's Geography and the Flavian Invasion of Scotland," in *Studien zu den Militärgrenzen Roms* (Cologne: Rheinland-Verlag in Kommission bei Rudolf Habelt, 1977), 2:45–64, and the works cited therein.

22. Richard Henry Major, trans. and ed., *Select Letters of Christopher Columbus, with Other Original Documents, Relating to His Four Voyages to the New World* (London: Hakluyt Society, 1847), 190–91; and Morison, *Journals,* 380–82 n. 1.

23. Irving, *Columbus,* 1:280; Keen, *Columbus,* 145–46; and Morison, *Southern Voyages,* 134.

24. Morison, *Admiral* (abr.), 556–57; and Morison, *Journals,* 285–88 and n. 6.

25. Sauer, *Spanish Main,* 75.

26. Morison, *Admiral* (abr.), 422.

27. Ibid., 477.

28. Morison, *Journals,* 282–83 n. 9.

29. Sauer, *Spanish Main,* 136–38.

30. Ibid., 146.

31. Nebenzahl, *Columbus,* 30; and Edward Luther Stevenson, "Martin Waldseemüller and the Early Lusitano-Germanic Cartography of the New World," *Bulletin of the American Geographical Society* 36, no. 4 (1904): 198.

32. For instance, Campbell, *Earliest Printed Maps,* 100.

33. Antonio Vascáno, "Biographical Essay on the Renowned Navigator and Cartographer, Juan de la Cosa," trans. Prof. Traynor, appendix A of *Catalogue of Maps, Plans, and Charts in the Map Room of the Dominion Archives,* ed. H. R. Holmden (Ottawa: Government Printing Bureau, 1912), 547; and Justin Winsor, *Christopher Columbus and How He Received and Imparted the Spirit of Discovery* (1891; reprint, Stamford, Conn.: Longmeadow Press, 1991), 382.

34. Noted by Nunn, *Mappemonde,* 4 n. 3.

BIBLIOGRAPHY

Adams, H. C. *The Wonder Book of Travellers' Tales.* New York: Liveright, 1927.

Adnan-Adivar, Abdülhak. *Osmanli Türklerinde İlim.* Annotated by A. Kazancigil and S. Tekeli. Istanbul: Remzi Kitabevi, 1982.

———. *La Science chez les Turcs Ottomans.* Paris: Librairie Orientale et Américaine, 1939.

Afetinan, A. "Un Amiral, geographe Turc du XVI siècle Piri Reis, auteur de la plus ancienne carte de l'Amerique." *Belleten* 1 (April 1937): 333–56.

———. *Life and Works of Piri Reis.* Translated by Leman Yolaç and Engin Uzmen. Publications of Turkish Historical Association, S. VII, no. 69a. Ankara: Turkish Historical Association, 1975.

———. *The Oldest Map of America, Drawn by Piri Reis.* Translated by Leman Yolaç. Ankara: Türk Tarih Kurumu Basimevi, 1954.

———. *Piri Reis'in Amerika Haritasi, 1513–1528.* Ankara: Türk Tarih Kurumu Basimevi, 1954.

Akçura, Yusuf. *Piri Reis Haritasi.* 1935. Reprint, Istanbul: Seyirve Hidrografi Dairesi, 1966.

———. "Turkish Interest in America in 1513: Piri Reis's Chart of the Atlantic." *Illustrated London News,* 23 July 1932, 142–43.

Almagià, Roberto. "The Atlas of Pietro Coppo, 1520." *Imago Mundi* 7 (1950): 48–50.

———. "Il Mappamondo di Piri Reis e la Carta di Colombo del 1498." *Bolletino della R. Società Geografica Italiana* 17 (June–July 1934): 442–49.

———. "Piri Re'is' World Map and Columbus' Chart of 1498." *Hydrographic Review* 11 (November 1934): 193–98.

Anderson, C. L. G. *Life and Letters of Vasco Núñez de Balboa, Including the Conquest and Settlement of Darien and Panama, the Odyssey of the Discovery of the South Sea, a Description of the Splendid Armada to Castilla del Oro and the Execution of the Adelantado at Acla: A History of the First Years of the Introduction of Christian Civilization on the Continent of America.* London: Fleming H. Revell, 1941.

———. *Old Panama and Castilla del Oro.* Washington: Sudwarth, 1911.

Anglería, Pedro Mártir de. *Décadas del Nuevo Mundo.* 1530. Buenos Aires: Editorial Bajel, 1944.

Atil, Esin. *The Age of Sultan Süleyman the Magnificent.* New York: Harry N. Abrams, 1987.

Babcock, William H. "The Island of the Seven Cities." *Geographical Review* 7 (February 1919): 98–106.

———. *Legendary Islands of the Atlantic: A Study in Medieval Geography.* American Geographical Research Series, no. 8. New York: American Geographical Society, 1922.

Babinger, Franz. "Piri Muhyi 'l-Din Re'is." In *Encyclopedia of Islam,* vol. 3, edited by M. Th. Houtsma. Leiden: E. J. Brill, 1936.

Baer, Elizabeth, Lloyd A. Brown, and Dorothy E. Miner, comps. *The World Encompassed.* Baltimore: Walters Art Gallery, 1952.

Bagrow, Leo. *Die Geschichte der Kartographie.* Berlin: Safari-Verlag, 1951.

———. *History of Cartography.* Revised and enlarged by R. A. Skelton. Translated by D. L. Paisey. Cambridge: Harvard University Press; London: C. A. Watts, 1964.

———. *Meister der Kartographie.* Revised and enlarged by R. A. Skelton. Berlin: Safari, 1963.

———. "Supplementary Notices to 'The Origin of Ptolemy's Geographia.'" *Imago Mundi* 4 (1947): 71–72.

———. "A Tale of the Bosphorus." *Imago Mundi* 12 (1955): 25–29.

Ballesteros Beretta, Antonio. *Cristóbal Colón y el descubrimiento de América.* Vol. 5 of *Historia de América.* Barcelona: Salvat Editores, S.A., 1945.

Bayat, Mert. Foreword to *Kitab-i Bahriye,* by Piri Reis. 4 vols. Istanbul: Historical Research Foundation, 1988.

Beans, George H. "Some Notes from the Tall Tree Library." *Imago Mundi* 7 (1950): 89–92.

Berlitz, Charles. *Atlantis, the Eighth Continent.* New York: G. P. Putnam's Sons, 1984.

———. *Mysteries from Forgotten Worlds.* Garden City, N.Y.: Doubleday, 1978.

Bibicou, H. "Sources byzantines pour servir a l'histoire maritime." In *Les sources de l'histoire maritime en Europe, du Moyen Age au XVIII siècle,* edited by Michel Mollat. Paris: S.E.V.P.E.N., 1962.

Black, Matthew. "Paul Ernst Kahle." *Proceedings of the British Academy* 51 (1966): 485–95.

Blessich, Aldo. *La geografia nella corte aragonese di Napoli.* Rome, 1897.

Boggs, Ralph S., Lloyd Kasten, Hayward Keniston, and H. B. Richardson, comps. *Tentative Dictionary of Medieval Spanish.* 2 vols. Chapel Hill: University of North Carolina Press, 1946.

Booth, Robert. "Dominica." *National Geographic Magazine* 177 (June 1990): 100–120.

Borde, Pierre-Gustave-Louis. *The History of Trinidad under the Spanish Government.* Vol. 1. Translated by James Alva Bain. 1876. Port-of-Spain, Trinidad: Paria, 1982.

Bordone, Benedetto. *Libro di Benedetto Bordone: Nel qual si ragiona de tutte l'isole del mondo.* 1528. Series of Atlases in Facsimile, 3d ser., vol. 1. Introduction by R. A. Skelton. Amsterdam: Theatrum Orbis Terrarum, 1966.

Branchi, Camillus E. *The Birth of America: A Contribution to the History of America.* New York: Vigo Press, 1937.

Bräunlich, E. "Zwei türkische Weltkarten aus dem Zeitalter der grossen Entdeckungen." *Berichte über die Verhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig Philologisch-historische Klasse* 89, no. 1 (1937): 1–29.

Brevoort, James Carson. "Notes on Giovanni da Verrazano and on the Planisphere of

1529 Illustrating His American Voyage in 1524." *Bulletin of the American Geographical Society* 4 (1872): 145–297.

Brice, William and Colin Imber. "Turkish Charts in the 'Portolan' Style." *Geographical Journal* 144 (November 1978): 528–29.

Brice, William, Colin Imber, and Richard Lorch. *The Aegean Sea-Chart of Mehmed Reis Ibn Menemenli, A.D. 1590/1.* Seminar on Early Islamic Science, monograph no. 2. Manchester, Eng.: University of Manchester, 1977.

Brown, Lloyd A. *The Story of Maps.* New York: Bonanza Books, 1949.

Burski, Hans-Albrecht von. "Kemal Re'is: Ein Beitrag zur Geschichte der türkischen Flotte." Diss., University of Bonn, 1928.

Burstyn, Harold L. Review of *Maps of the Ancient Sea-Kings,* by Charles H. Hapgood. *Terrae Incognitae* 1 (1969): 77.

Caetano da Silva, Joaquim. *L'Oyapoc et l'Amazone: Question Brésilienne et Française.* Paris: L. Martinet, 1861.

Campbell, Tony. *The Earliest Printed Maps, 1472–1500.* Berkeley: University of California Press, 1987.

———. "Portolan Charts from the Late Thirteenth Century to 1500." Chap. 19 in *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean.* Vol. 1 of *The History of Cartography,* edited by J. B. Harley and David Woodward. Chicago: University of Chicago Press, 1987.

Clancy, Robert. "The Mapping of 'Terra Australis.'" *Map Collector,* no. 55 (summer 1991): 10–15.

———. *The Mapping of Terra Australis.* Macquarie Park, N.S.W., Australia: Universal Press, 1995.

Cohen, Daniel. *The Ancient Visitors.* Garden City, N.Y.: Doubleday, 1976.

Cohen, I. Bernard. "What Columbus 'Saw' in 1492." *Scientific American* 267 (December 1992): 100–106.

Cohen, J. M., ed. and trans. *The Four Voyages of Christopher Columbus.* New York: Penguin Books, 1969.

Colombo, Cristoforo. *Epistola de Insulis Nuper Inventis.* Reprint of Latin translation by Leander di Cosco of 1493. English translation by Frank E. Robbins. Ann Arbor, Mich.: Readex Microprint, 1966.

"A Columbus Controversy: America and Two Atlantic Charts." *Illustrated London News,* 27 February 1932, 307.

Cortesão, Armando. *Cartografia e cartógrafos portugueses dos séculos XV e XVI.* 2 vols. Lisbon: Seara Nova, 1935.

———. *History of Portuguese Cartography.* 2 vols. Coimbra: Junta de Investigações do Ultramar-Lisboa, 1969–71.

———. *The Nautical Chart of 1424 and the Early Discovery and Cartographical Representation of America: A Study on the History of Early Navigation and Cartography.* Coimbra: University of Coimbra, 1954.

———. "The North-Atlantic Nautical Chart of 1424." *Imago Mundi* 10 (1953): 1–13.

———. *The Suma Oriental of Tomé Pires* and *The Book of Francisco Rodrigues.* 2 vols. London: Hakluyt Society, 1944.

Cortesão, Armando, and Avelino Teixeira da Mota. *Portugaliae Monumenta Cartographica.* 6 vols. 1960. Reprint, with additions, Lisbon: Imprensa Nacional-Casa da Moeda, 1987.

Cortesão, Jaime. *Os Descobrimentos Portugueses.* 2 vols. Lisbon: Arcadia, 1960–62.

———. *História do Brasil nos Velhos Mapas.* Vol. 1. Rio de Janeiro: Instituto Rio Branco, 1965.

Cotter, Charles H. "Piri Reis: Admiral Extraordinary." *Journal of Navigation* 25 (April 1972): 247–49.

Crone, G. R. *The Discovery of America.* New York: Weybright and Talley, 1969.

———. *Maps and Their Makers: An Introduction to the History of Cartography.* London: Hutchinson's University Library, 1953.

———. "The Origin of the Name Antilia." *Geographical Journal* 91 (March 1938): 260–62.

Cumming, William P. *The Southeast in Early Maps, with an Annotated Check List of Printed and Manuscript Regional and Local Maps of Southeastern North America during the Colonial Period.* 2d ed. Chapel Hill: University of North Carolina Press, 1962.

Cumming, W. P., R. A. Skelton, and D. B. Quinn. *The Discovery of North America.* New York: American Heritage Press, 1972.

Cuyás, Arturo. *Appleton's New English-Spanish and Spanish-English Dictionary.* 3d ed. Revised and enlarged by Antonio Llano. New York: Appleton-Century-Crofts, 1943.

Davies, Arthur. "The Egerton MS. 2803 Map and the Padrón Real of Spain of 1510." *Imago Mundi* 11 (1954): 47–52.

———. "The 'English' Coasts on the Map of Juan de la Cosa." *Imago Mundi* 13 (1956): 26–29.

Deagan, Kathleen A. "La Isabela, Europe's First Foothold in the New World." *National Geographic Magazine* 181 (January 1992): 40–53.

Deissmann, Adolf. *Forschungen und Funde im Serai: Mit einem Verzeichnis der nichtislamischen Handschriften im Topkapu Serai in Istanbul.* Berlin: Walter de Gruyter, 1933.

Denucé, J. "The Discovery of the North Coast of South America According to an Anonymous Map in the British Museum." *Geographical Journal* 36 (July 1910): 65–80, 128.

Derby, Orville A. "The Egerton Map of Early American Discoveries." *Geographical Journal* 38 (November 1911): 494–504.

———. "The Northeast Coast of Brazil in Ancient Cartography." *Science,* n.s., 19 (29 April 1904): 681–94.

Dilke, Margaret S., and A. Brancati. "The New World in the Pesaro Map." *Imago Mundi* 31 (1979): 78–83.

Dilke, O. A. W. "The Culmination of Greek Cartography in Ptolemy." Chapter 11 in *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean.* Vol. 1 of *The History of Cartography,* edited by J. B. Harley and David Woodward. Chicago: University of Chicago Press, 1987.

———. *Greek and Roman Maps.* Ithaca, N.Y.: Cornell University Press, 1985.

Diller, Aubrey. "The Oldest Manuscripts of Ptolemaic Maps." *Transactions and Proceedings of the American Philological Association* 71 (1940): 62–67.

Divine, David. *The Opening of the World: The Great Age of Maritime Exploration.* New York: G. P. Putnam's Sons, 1973.

Dunn, Oliver, and James E. Kelley Jr. *The Diario of Christopher Columbus's First Voyage to America, 1492–1493.* Norman: University of Oklahoma Press, 1989.

Eckert, Allan W. *The HAB Theory.* Boston: Little, Brown, 1976.

Eden, Richard. *The Decades of the Newe World or West India.* Translation of *De rebus oceanicis et orbe novo decades,* by Pietro Martire d'Anghiera, and other works. 1555. Reprint, Ann Arbor, Mich.: Readex Microprint, 1966.

———. *A Treatyse of the Newe India.* Translation of part of book 5 of *Cosmographiae universalis,* by Sebastian Münster. 1553. Reprint, Ann Arbor, Mich.: Readex Microprint, 1966.

Edwards, Clinton R. "The Discoveries of Mexico and the Meaning of Discovery." *Terrae Incognitae* 17 (1985): 61–67.

———. "The Origin and Significance of the 'Bartholomew Columbus Maplets.'" Paper read at the thirty-second annual meeting of the Society for the History of Discoveries, Miami, 3 October 1992.

———. "The Test of Time." In *The Geographical Conceptions of Columbus: A Critical Consideration of Four Problems,* by George E. Nunn, 149–95. Expanded edition with additions. 1924. Reprint, Milwaukee: American Geographical Society Collection of the Golda Meir Library, University of Wisconsin, Milwaukee, 1992.

Enterline, James. "The Southern Continent and the False Strait of Magellan." *Imago Mundi* 26 (1972): 48–59.

Fernández Duro, Cesáreo. *Pleitos de Colón.* 2 vols. Vols. 7 and 8 of *Colección de documentos inéditos relativos al descubrimiento, conquista y organización de las antiguas posesiones españolas de Ultramar.* 2d ser. 25 vols. Madrid: Real Academia de la Historia, 1892–94.

Fernández-Armesto, Felipe. *Before Columbus: Exploration and Colonisation from the Mediterranean to the Atlantic, 1229–1492.* New Studies in Medieval History. Ed. Maurice Keen. London: Macmillan Education, 1987.

———. *Columbus.* Oxford: Oxford University Press, 1991.

Ferraro, Giuseppe. *Relazione delle scoperte fatte da C. Colombo, da A. Vespucci e da altri dal 1492 al 1506.* Bologna: Presso Gaetano Romagnoli, 1875.

Ferris, Timothy. "Playboy Interview: Erich von Däniken." *Playboy* 21 (August 1974): 51–52, 56–58, 60, 64, 151.

Finsterwalder, Rütiger. "The Round Earth on a Flat Surface: World Map Projections before 1550." In *America: Early Maps of the New World,* edited by Hans Wolff, translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

Fiske, John. *The Discovery of America.* 2 vols. Boston: Houghton Mifflin, 1892.

Fite, Emerson D., and Archibald Freeman. *A Book of Old Maps Delineating American*

History from the Earliest Days down to the Close of the Revolutionary War. 1926. Reprint, New York: Dover, 1969.

Foreman, Laura, ed. *Feats and Wisdom of the Ancients.* Volume of *Library of Curious and Unusual Facts* series. Edited by Russell B. Adams Jr. Alexandria, Va.: Time-Life Books, 1990.

Formisano, Luciano, ed. *Letters from a New World: Amerigo Vespucci's Discovery of America.* Translated by David Jacobson. New York: Marsilio, 1992.

Forsyth, Phyllis Young. *Atlantis: The Making of Myth.* Montreal: McGill-Queen's University Press, 1980.

Friedman, John Block. *The Monstrous Races in Medieval Art and Thought.* Cambridge: Harvard University Press, 1981.

Frontières entre le Brésil et la Guyane Française: Mémoire présenté par les Etats Unis du Brésil au gouvernement de la Confédération Suisse arbitre choisi selon les stipulations du traité conclu à Rio-de-Janeiro, le 10 avril 1897 entre la Brésil et le France. 3 vols. Paris: A. Lahure, 1899.

Fuson, Robert H. "The *Diario de Colón:* A Legacy of Poor Transcription, Translation, and Interpretation." *Terrae Incognitae* 15 (1983): 51–75.

———. *Legendary Islands of the Ocean Sea.* Sarasota, Fla.: Pineapple Press, 1995.

———. *The Log of Christopher Columbus.* Camden, Maine: International Marine, 1987.

Gandía, Enrique de. *Américo Vespucci y Sus Cinco Viajes al Nuevo Mundo.* Buenos Aires: Fundación Banco de Boston, 1991.

George, Wilma. *Animals and Maps.* Berkeley: University of California Press, 1969.

———. "The Yale." *Journal of the Warburg and Courtauld Institutes* 31 (1968): 423–28.

Gerini, G. E. *Researches on Ptolemy's Geography of Eastern Asia (Further India and Indo-Malay Archipelago).* Asiatic Society Monograph, no. 1. London: Royal Asiatic Society and Royal Geographical Society, 1909.

Gillespie, Alan R. "Stone Henge and the Piri Re'is Map." *Navigation: Journal of the Institute of Navigation* 17 (summer 1970): 122–23.

Gómez Márquez, Manuel. *La Atlántida de Piri Reis.* Barcelona: Fontana Fantástica (Ediciones Martínez Roca, S.A.), 1984.

Goodrich, Thomas D. "The New World in the Ottoman World: Some Ottoman Thoughts and Some American Things." In *Mundialización de la ciencia y cultural nacional.* Proceedings of the International Congress on Science and the Discovery of America, Madrid, 1993.

———. "Old Maps in the Library of Topkapi Palace in Istanbul." *Imago Mundi* 45 (1993): 120–33.

———. "Ottoman Portolans." *Portolan: Journal of the Washington Map Society* 7 (1986): 6–11.

Gordon, Cyrus. *Before Columbus: Links between the Old World and Ancient America.* New York: Crown, 1971.

Goss, John. *The Mapping of North America: Three Centuries of Map-Making, 1500–1860.* Secaucus, N.J.: Wellfleet Press, 1990.

Gould, Alicia B. *Nueva lista documentada de los tripulantes de Colón en 1492.* Madrid: Real Academia de la Historia, 1984.

Gould, Rupert T. *Oddities: A Book of Unexplained Facts.* 1928. Reprint, New York: Paperback Library Edition, 1969.

Granberry, Julian. "Lucayan Toponyms." *Journal of the Bahamas Historical Society* 13 (October 1991): 3–12.

Graubard, Mark, trans., and John Parker, ed. *Tidings out of Brazil.* Minneapolis: University of Minnesota Press, 1957.

Greenlee, William Brooks. *The Voyage of Pedro Álvares Cabral to Brazil and India from Contemporary Documents and Narratives.* 1938. Reprint, Nendeln, Liechtenstein: Kraus, 1967.

Grosjean, George, ed. *The Catalan Atlas of the Year 1375.* Dietkon-Zurich: Urs Graf, 1978.

Guedes, Max Justo. "O Mapa de Piri Reis (1513): Um Quebra-Cabeças Histórico?" *Revista Marítima Brazileira* 114 (July–September 1994): 115–36.

Guirao, Pedro. *El Enigma de los Mapas de Piri Reis.* Barcelona: Libroexprés, 1980.

Hallam, Henry. *Introduction to the Literature of Europe in the Fifteenth, Sixteenth, and Seventeenth Centuries.* 4 vols. London: John Murray, 1872.

Hamdani, Abbas. "An Islamic Background to the Voyages of Discovery." In *The Legacy of Muslim Spain.* Edited by Salma Khadra Jayyusi. New York: E. J. Brill, 1992.

Hancock, Graham. *Fingerprints of the Gods.* New York: Crown, 1995.

Hapgood, Charles H. *Maps of the Ancient Sea-Kings: Evidence of Advanced Civilization in the Ice Age.* New York: Chilton, 1966.

Haring, Clarence H. *Trade and Navigation between Spain and the Indies in the Time of the Hapsburgs.* Vol. 19 of *Harvard Economic Studies.* Cambridge: Harvard University Press, 1918.

Harley, J. Brian. *Maps and the Columbian Encounter.* Milwaukee: Golda Meir Library, University of Wisconsin, 1990.

Harley, J. B., and David Woodward, eds. *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean.* Vol. 1 of *The History of Cartography.* Chicago: University of Chicago Press, 1987.

Harrisse, Henry. *La découverte et évolution cartographique de Terre-Neuve et des Pays Circonvoisins, 1497–1501–1769.* Paris: H. Welter; London: Henry Stevens, Son and Stiles, 1900.

———. *The Diplomatic History of America: Its First Chapter, 1452–1493–1494.* London: B. F. Stevens, 1897.

———. *The Discovery of North America.* 1892. Reprint, Amsterdam: N. Israel, 1961.

———. *Notes on Columbus.* New York: Privately printed, 1866.

Hartog, J. *History of Saba.* Saba, Netherlands Antilles: Van Guilder N.V., 1975.

Heawood, Edward. "Lopo Homem's Map of 1519." *Geographical Journal* 77 (March 1931): 250–53.

———. "An Undescribed Map of Lopo Homem, 1519." *Geographical Journal* 76 (August 1930): 159–60.

———. "The World-Map of Piri Reis, 1513: Review." *Geographical Journal* 82 (September 1933): 267–69.

Heer, Nicholas, ed. *The Precious Pearl: Al-Jāmī's Al-Durrah Al-Fakhirah Together with His "Glosses" and the "Commentary" of 'Abd al-Ghafūr al-Lārī.* Albany: State University of New York Press, 1979.

Henige, David. *In Search of Columbus: The Sources for the First Voyage.* Tucson: University of Arizona Press, 1991.

Hess, Andrew C. "Piri Reis and the Ottoman Response to the Voyages of Discovery." *Terrae Incognitae* 6 (1974): 19–37.

Hoffman, Bernard G. *Cabot to Cartier: Sources for a Historical Ethnography of Northeastern North America, 1497–1550.* Toronto: University of Toronto Press, 1961.

Holtzscherer, J. J., and G. de Q. Robin. "Depth of Polar Ice Caps." *Geographical Journal* 120 (June 1954): 192–202, and folding maps facing p. 263.

Holzheimer, Arthur, and David Buisseret. *The "Ramusio" Map of 1534.* Hermon Dunlap Smith Center for the History of Cartography, Occasional Publication no. 6. Chicago: Newberry Library, 1992.

Howse, Derek, and Michael Sanderson. *The Sea Chart: An Historical Survey Based upon the Collections in the National Maritime Museum.* New York: McGraw-Hill, 1973.

Hubbard, Lucius L. "Did Columbus Discover the Islands Antigua and St. Martin?" *Geographical Review* 21 (October 1931): 584–97.

Hues, Robert. *Tractatus de globis et eorum usu.* Translated by John Chilmead. Edited by Clements R. Markham. 1869. Reprint, New York: Burt Franklin, n.d. [1963?].

Humble, Richard. *The Explorers.* Vol. 3 of *The Seafarers.* Alexandria, Va.: Time-Life Books, 1979.

Irving, Washington. *The History of the Life and Voyages of Christopher Columbus.* 1827–28. Reprint (2 vols. in 1), London: Henry G. Bohn, 1850.

———. *The Voyages of the Companions of Columbus.* Vol. 5 of *The Works of Washington Irving.* New York: P. F. Collier and Son, 1880.

Jane, Cecil. *The Four Voyages of Columbus.* Reprint of *Select Documents Illustrating the Four Voyages of Columbus,* 1930–33. 2 vols. in 1. New York: Dover, 1988.

———, trans. *The Journal of Christopher Columbus.* Reprint of 1930, with additions. Appendix "The Cartography of Columbus' First Voyage" by R. A. Skelton. New York: Bramhall House, 1960.

Johnson, Donald S. *Phantom Islands of the Atlantic.* Fredericton, N.B., Canada: Goose Lane, 1994.

Jolly, David C. "Was Antarctica Mapped by the Ancients?" *Skeptical Inquirer* 11 (fall 1986): 32–43.

Joseph, E. L. *History of Trinidad.* 1838. Reprint, London: Frank Cass, 1970.

Judge, Joseph, ed. *A Columbus Casebook: A Supplement to "Where Columbus Found the New World."* Washington, D.C.: National Geographic Society, 1986.

Kahane, Henry, Renée Kahane, and Andreas Tietze. *The Lingua Franca in the Levant. Turkish Nautical Terms of Italian and Greek Origin.* Urbana: University of Illinois Press, 1958.

Kahle, Paul. "Eine Amerika-Karte, gezeichnet auf Grund einer Columbus-Karte und portugiesischer Karten vom Türken Piri Re'is im Jahre 1513." *Actes du XVIIIe Congrés International des Orientalistes.* Leiden (7–12 September 1932): 105–6.

———. "Impronte Columbiane in una Carta Turca del 1513." *La Cultura Moderna* 10 (1931): 775–85.

———. "A Lost Map of Columbus." *Geographical Review* 23 (October 1933): 621–38.

———. "Un Mapa de América Hecho por el Turco Piri Re'is, en el Año 1513, Basándose en un Mapa de Colón y en Mapas Portugueses." *Investigación y Progreso* 5 (1 December 1931): 169–72.

———. "Piri Re'is: The Turkish Sailor and Cartographer." *Journal of the Pakistan Historical Society* 4 (April 1956): 99–108.

———. "Piri Reis und seine Bahrije." In *Beitrage zur historischen Geographie, Kulturgeographie, Ethnographie, und Kartographie, vornehmlich des Orients.* Edited by Hans Mžik. Leipzig: F. Deuticke, 1929.

———. "Die Verschollene Columbus-Karte von Amerika von Jahre 1498 in einer türkischen Weltkarten von 1513." *Forschungen und Fortschritte* 8 (1 July 1932): 248–49.

———. *Die Verschollene Columbus-Karte von 1498 in einer türkischen Weltkarte von 1513.* Berlin: Walter de Gruyter, 1933.

———, ed. and trans. *Piri Re'is, Bahrije: Das türkische Segelhandbuch für das Mittelländische Meer vom Jahre 1521.* 2 vols. Berlin: Walter de Gruyter, 1926–27.

Keen, Benjamin, trans. *The Life of the Admiral Christopher Columbus by His Son Ferdinand.* New Brunswick, N.J.: Rutgers University Press, 1959.

Kelley, James E. Jr. "Columbus's Navigation: Fifteenth-Century Technology in Search of Contemporary Understanding." Paper read at the Patristic Medieval Renaissance conference, Villanova University, Villanova, Penn., 26 September 1992.

———. "Distortions on Sixteenth-Century Maps of America." *Cartographica* 32 (winter 1995): 1–13.

———. "The Map of Bahamas Implied by Chaves's *Derrotero:* What Is Its Relevance to the First Landfall Question?" *Imago Mundi* 42 (1990): 26–49.

———. "Perspectives on the Origins and Uses of the Portolan Charts." *Cartographica* 32 (autumn 1995): 1–16.

———. "Still Lost in the Indies after All These Years: Interpreting Early Maps of America." Paper read at the thirty-fourth annual meeting of the Society for the History of Discoveries, Mackinac Island, Mich., 24 September 1994.

———. "The Vopel Gores of 1536 and Other Mappa Mundi Showing America in the Early Sixteenth Century." Typescript, Menlo Park, Penn., 1975.

———. "Working Concepts re the Origin and Use of the Portolan Chart." Typescript, Menlo Park, Penn., 1989.

Kelsey, Harry. "The Planispheres of Sebastian Cabot and Sancho Gutiérrez." *Terrae Incognitae* 19 (1987): 41–58.

Keyhoe, Donald E. *Aliens from Space.* Garden City, N.Y.: Doubleday, 1973.

———. *Flying Saucers: Top Secret.* New York: Putnam, 1960.

King, Francis. *The Cosmic Influence.* Garden City, N.Y.: Doubleday, 1976.

Kirbus, Federico B. *Enigmas, Misterios y Secretos de América: Tiahuanaco, Las líneas de Nazca, Vilcabamba, El mapa de Piri Reis.* Buenos Aires: Editorial La Barca Gráfica, 1976.

Kohl, Johann Georg. "Asia and America: An Historical Disquisition Concerning the Ideas Which Former Geographers Had About the Geographical Relation and Connection of the Old and New World." *Proceedings of the American Antiquarian Society,* n.s., 21 (October 1911): 284–338.

Konyali, Ibrahim Hakki. *Topkapi Sarayinda deri üzerine yapilmiş eski haritalar.* Istanbul: Zaman Kitaphanesi, 1936.

Kretschmer, Konrad. *Die Entdeckung Amerikas in ihrer Bedeutung für die Geschichte des Weltbildes.* Berlin: W. H. Kühl, 1892.

———. *Die italienischen Portolane des Mittelalters ein Beitrag zur Geschichte der Kartographie und Nautik.* 1909. Reprint, Hildesheim, Germany: Georg Olms, 1962.

———. "Die Verschollene Kolumbuskarte von 1498 in einer türkischen Weltkarte von 1513." *Petermanns Mitteilungen* 80 (1934): 48–50.

Kukal, Zdeněk. *Atlantis in the Light of Modern Research.* Amsterdam: Elsevier, 1984.

Landström, Björn. *Columbus.* New York: Macmillan, 1967.

Lanman, Jonathan T. *On the Origin of Portolan Charts.* The Hermon Dunlap Smith Center for the History of Cartography Occasional Publication, no. 2. Chicago: Newberry Library, 1987.

La Roncière, Charles de. *La Carte de Christophe Colomb.* Paris: Éditions Historiques and Édouard Champion, 1924.

Leighly, John. *California as an Island: An Illustrated Essay.* San Francisco: Book Club of California, 1972.

Lemos, William. "The Quest for the Santa Maria." *Naval Institute Proceedings* 118, no. 2 (1992): 109–12.

Levillier, Roberto. *América, la bien llamada.* Buenos Aires: Editorial Guillermo Kraft, 1948.

Lindgren, Uta. "Trial and Error in the Mapping of America during the Early Modern Period." In *America: Early Maps of the New World,* edited by Hans Wolff, translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

Lliboutry, Louis. Letter to editor. *Eos* 65 (18 December 1984): 1226.

Lunde, Paul. "Piri Reis and the Columbus Map." *Aramco World* 43 (May–June 1992): 18–25.

Lyon, Eugene. "Search for Columbus." *National Geographic Magazine* 181 (January 1992): 2–39.

McCulloch, Florence. *Mediaeval Latin and French Bestiaries.* Studies in the Romance Languages and Literatures, no. 33. Rev. ed. Chapel Hill: University of North Carolina Press, 1962

McGuirk, Donald L. Jr. "The Depiction of Cuba on the Ruysch Map." *Terrae Incognitae* 20 (1988): 89–97.

———. "The Island of Triango on Early Maps." Paper presented at the twenty-ninth

annual meeting of the Society for the History of Discoveries, San Francisco, 9 June 1989.

———. "The Mystery of Cuba on the Ruysch Map." *Map Collector*, no. 36 (September 1986): 40–41.

———. "Ruysch World Map: Census and Commentary." *Imago Mundi* 41 (1989): 133–41.

McIntosh, Gregory C. "The Cantino Map and the Cartographic Evolution of the West Indies." Paper presented at the thirty-fifth annual meeting of the Society for the History of Discoveries, University of Texas, Arlington, 4 November 1995.

———. "Christoph Kolumbus und die Piri-Re'is-Karte von 1513." *Cartographica Helvetica* 11 (1995): 36–42.

———. "Christopher Columbus and the Piri Reis Map of 1513." *American Neptune* 53 (fall 1993): 280–94.

———. "Columbus and the Depiction of Hispaniola and Cuba on the Piri Reis Map of 1513." *Portolan: Journal of the Washington Map Society* 25 (fall 1992): 12–18.

———. "Columbus and the Depiction of the West Indies on the Piri Reis Map." Paper presented at the twenty-fifth annual meeting of the Middle East Studies Association of North America, Washington, D.C., 26 November 1991.

———. "Martín Alonso Pinzón's Discovery of Babueca and the Identity of Guanahani." *Terrae Incognitae* 24 (1992): 79–100.

———. "Old Maps Misused and Abused." Review of *Fingerprints of the Gods*, by Graham Hancock. *California Map Society Newsletter* (1996): 11–13.

McLaughlin, Glen, with Nancy Mayo. *The Mapping of California as an Island: An Illustrated Checklist.* California Map Society, Occasional Paper no. 5. Saratoga: California Map Society, 1995.

MacNutt, Francis Augustus, ed. *De Orbe Novo: The Eight Decades of Peter Martyr D'Anghera.* 2 vols. 1912. Reprint, New York: Burt Franklin, 1970.

Major, Richard Henry, trans. and ed. *Select Letters of Christopher Columbus, with Other Original Documents, Relating to His Four Voyages to the New World.* London: Hakluyt Society, 1847.

Malheiro Dias, Carlos, Conselheiro Ernesto de Vasconcelos, and Roque Gameiro. *História da Colonização Portuguesa do Brasil.* 3 vols. Oporto, Portugal: Litografia Nacional, 1921.

Mallery, Arlington H., with Daniel L. Linehan and M. I. Walters. "New and Old Discoveries in Antarctica." Radio broadcast by the Georgetown University Forum of the Air. Washington, D.C., 26 August 1956.

Mallery, Arlington, and Mary Roberts Harrison. *The Rediscovery of Lost America.* Revision of 1951 ed. of *Lost America: The Story of Iron-Age Civilization prior to Columbus*, by A. H. Mallery, with additions by M. R. Harrison. New York: E. P. Dutton, 1979.

Manzano Manzano, Juan. *Los Pinzones y el Descubrimiento de América.* 3 vols. Madrid: Ediciones de Cultura Hispánica, 1988.

Mardin, Osman. "Piri Reis: Turkish Admiral and Cartographer." *Map Collector*, no. 16 (September 1981): 16–21.

Martín Merás, Luisa. "Spanische Kartographie." In *Lexikon zur Geschichte der Kartographie.* Edited by Ingrid Kretschmer, Johannes Dörflinger, and Franz Wawrik. 2 vols. Vienna: Franz Deuticke, 1986.

Martyr, Peter. See Anglería, Pedro Mártir de; MacNutt, Francis Augustus.

Marvel, Josiah. "The First Independent Voyage of Vicente Yáñez Pinzón." *HRD News* 2 (January–February 1990): 6–10.

———. "Lucaiarum Tabula Onomastica: A Toponymy of the Lucayan Archipelago." Typescript. Providenciales, Turks and Caicos Islands, British West Indies, 1988.

———. "On the First Landfall of Christopher Columbus in the New World: Textual and Cartographic Evidence Supporting the Hypothesis That It Took Place on Grand Turk Island." Typescript. Providenciales, Turks and Caicos Islands, British West Indies, 1990.

Mattingly, Garrett. "Navigator to the Modern Age." *Horizon* 3 (November 1960): 72–83.

Milani, Virgil I. "Italicisms in Christopher Columbus' First American Bulletin." *Forum Italicum* 2 (March 1968): 40–43.

Milton, Daniel J. Letter to editor. *Eos* 65 (18 December 1984): 1226.

Mollat du Jourdin, Michel, and Monique de La Roncière, with Marie-Madeleine Azard, Isabelle Raynaud-Nguyen, and Marie-Antoinette Vannereau. *Sea Charts of the Early Explorers, Thirteenth to Seventeenth Century.* Translated by L. le R. Dethan. New York: Thames and Hudson, 1984.

Mooney, Richard E. *Colony: Earth.* New York: Stein and Day, 1974.

Morison, Samuel Eliot. *Admiral of the Ocean Sea.* 2 vols. Boston: Little, Brown, 1942.

———. *Admiral of the Ocean Sea.* Abridged one volume. Boston: Little, Brown, 1942.

———. *The European Discovery of America: The Northern Voyages, A.D. 500–1600.* New York: Oxford University Press, 1971.

———. *The European Discovery of America: The Southern Voyages, A.D. 1492–1616.* New York: Oxford University Press, 1974.

———. *Journals and Other Documents on the Life and Voyages of Christopher Columbus.* New York: Heritage Press, 1963.

———. *Portuguese Voyages to America in the Fifteenth Century.* Harvard Historical Monographs, no. 14. Cambridge: Harvard University Press, 1940.

———. "The Route of Columbus along the North Coast of Haiti, and the Site of Navidad." *Transactions of the American Philosophical Society,* n.s., 31, no. 4 (1940): 239–85.

———. *The Second Voyage of Christopher Columbus.* Oxford: Oxford University Press, 1939.

Morison, Samuel Eliot, and Mauricio Obregón. *The Caribbean as Columbus Saw It.* Boston: Little, Brown, 1964.

Muro Orejón, Antonio, ed. *Pleitos colombinos.* 4 vols. Sevilla: Escuela de Estudios Hispano-Americanos, 1964–89.

Nansen, Fridtjof. *In Northern Mists: Arctic Exploration in Early Times.* Translated by Arthur G. Chater. 2 vols. London: William Heinemann, 1911.

Navarrete, Martín Fernández de. *Colección de los viages y descubrimientos que hicieron*

por mar los Españoles desde fines del siglo xv. 5 vols. 1825–37. Reprint, Buenos Aires: Editorial Guarania, 1945.

Nebenzahl, Kenneth. *Atlas of Columbus and the Great Discoveries.* Chicago: Rand McNally, 1990.

Neuman, Henry. *A New Dictionary of the Spanish and English Languages; Wherein the Words Are Explained Agreeable to Their Different Meanings, and a Great Variety of Terms Relating to the Arts, Sciences, Trade, and Navigation, Carefully Elucidated.* London: Vernon and Hood, J. Sewell, Cuthell and Martin, J. Walker, T. Boosey, Lackington, Allen and Co., R. Lea, Otridge and Son, Ogilvy and Son, and J. Nunn, 1802.

Nicholson, Desmond V. *Place Names in Antigua and Barbuda.* Antigua Archeological and Historical Society, 1984.

———. *The Story of the Arawaks in Antigua and Barbuda.* Antigua Archeological and Historical Society, 1983.

Noorbergen, Rene. *Secrets of the Lost Races: New Discoveries of Advanced Technology in Ancient Civilizations.* Indianapolis: Bobbs-Merrill, 1977.

Nordenskiöld, A. E. *Facsimile-Atlas to the Early History of Cartography with Reproductions of the Most Important Maps Printed in the Fifteenth and Sixteenth Centuries.* Translated by Johan Adolf Ekelöf and Clements R. Markham. 1889. New York: Dover, 1973.

———. *Periplus: An Essay on the Early History of Charts and Sailing Directions.* 1897. Reprint, New York: Burt Franklin, n.d. [1967?].

Nunn, George E. *The Columbus and Magellan Concepts of South American Geography.* Glenside, Penn.: Privately printed, 1932.

———. *The Geographical Conceptions of Columbus: A Critical Consideration of Four Problems.* 1924. Reprint, with additions, Milwaukee: American Geographical Society Collection of the Golda Meir Library, University of Wisconsin, 1992.

———. *The La Cosa Map and the Cabot Voyages: Was New York Bay Discovered by John Cabot, 1498?* Tall Tree Library no. 19. Jenkintown, Penn.: Privately printed, 1946.

———. *The Mappemonde of Juan de la Cosa: A Critical Investigation of Its Date.* Jenkintown, Penn.: George H. Beans Library, 1934.

———. "Marinus of Tyre's Place in the Columbus Concepts." *Imago Mundi* 2 (1937): 27–35.

———. *Origin of the Strait of Anian Concept.* Philadelphia: Privately printed, 1929.

———. "A Reported Map of Columbus." *Geographical Review* 15 (1925): 688–90.

———. "The Three Maplets Attributed to Bartholomew Columbus." *Imago Mundi* 9 (1952): 12–22.

———. *World Map of Francesco Roselli* (also titled *Roselli Oval World Map*). Philadelphia: Privately printed, 1928.

Oberhummer, Eugen. "Eine Karte des Columbus in türkischer Überlieferung." *Mitteilungen der Geographischen Gesellschaft in Wien* 77, nos. 7–9 (1934): 115–17.

———. "Eine turkische Karte zur Entdeckung Amerikas." *Anzeiger der Akademie der Wissenschaften in Wien, Philos-histor. Klasse,* nos. 8–27 (1931): 99–112.

———. "Die verschollene Columbus-Karte von Amerika vom Jahre 1498 in einer türkischen Weltkarte von 1513." *Forschungen und Fortschritten* 8 (July 1932).

Obregón, Mauricio. *Argonauts to Astronauts.* New York: Harper and Row, 1980.

Oelschläger, Victor R. B. *A Medieval Spanish Word-List.* Madison: University of Wisconsin Press, 1940.

Olschki, Leonardo. "The Columbian Nomenclature of the Lesser Antilles." *Geographical Review* 33 (July 1943): 397–414.

Osley, A. S. *Mercator: A Monograph on the Lettering of Maps, etc., in the Sixteenth-Century Netherlands, with a Facsimile and Translation of His Treatise on the Italic Hand and a Translation of Ghim's Vita Mercatoris.* With a foreword by R. A. Skelton. New York: Watson-Guptill, n.d. [1969].

Pauwels, Louis, and Jacques Bergier. *Le Matin des magiciens.* Paris: Gallimard, 1960.

———. *The Morning of the Magicians.* Translated by Rollo Myers. New York: Stein and Day, 1964.

Payne, Ann. *Medieval Beasts.* New York: New Amsterdam Books, 1990.

Peck, Douglas C. *Cristoforo Colombo: God's Navigator.* Columbus, Wisc.: Columbian, 1993.

Penn, James, comp. *The South American Pilot. Part I. The East Coast of South America from Cape St. Roque to Cape San Antonio, Rio de la Plata; and the North Coast from Cape St. Roque to the Rio Maroni in French Guayana.* London: Hydrographic Office, Admiralty, 1864.

Pina, Ruy de. *Chronica d'El Rei Dom João II.* no. 4 in Vol. 2 of *Colleçcão de Livros Inéditos de História Portugueza.* Edited by José Corrêa da Serra. Lisbon: Academia Real das Sciencias, 1792.

Piri Reis. *Kitab-i Bahriye.* Facsimile of 1526 manuscript in the Ayasofya Library, no. 2612. Turkish Historical Society Publication, no. 2. Istanbul: Türk Tarih Kurumu, 1935.

———. *Kitab-i Bahriye.* Facsimile of 1526 manuscript in the Ayasofya Library, no. 2612. Edited by Ertuğrul Zekâi Ökte. Vol. 1. Istanbul: Historical Research Foundation, 1988.

Pliny. *Natural History, with an English Translation in Ten Volumes.* Translated by H. Rackham. Vol. 2, bks. 3–7. London: William Heinemann; Cambridge: Harvard University Press, 1961.

Pohl, Frederick J. *Amerigo Vespucci: Pilot Major.* New York: Columbia University Press, 1944.

———. "The Pesaro Map, 1505." *Imago Mundi* 7 (1950): 82–83.

Polk, Dora Beale. *The Island of California: A History of the Myth.* Spokane, Wash.: Arthur C. Clark, 1991.

Polo, Marco. *The Travels of Marco Polo.* Translated by Henry Yule. Revised by Henri Cordier. 2 vols. Reprint of 1929 3d printing of 1903 3d ed. New York: Dover, 1993.

Pope, Hugh. "Legacy of Turkey's 'Immortal' Ataturk Slowly Starts to Fade," *Los Angeles Times,* 15 January 1991, H4.

Porcacchi da Castilione, Tomasco. *l'Isole più famose del Mondo.* Venice: S. Galignani, 1576.

Portinaro, Pierluigi, and Franco Knirsh. *The Cartography of North America, 1500–1800.* New York: Facts on File, 1987.

Potter, Jonathan. *The Country Life Book of Antique Maps.* Secaucus, N.J.: Chartwell Books, 1989.

Puente y Olea, Manuel de la. *Los trabajos geográficos de la Casa de Contratación.* Seville: Escuela tipográfica y librería Salesianas, 1903.

Rainaud, Armand. *Le continent austral: Hypothèses et découvertes.* Paris: Armand Colin, 1893.

Ramsay, Raymond H. *No Longer on the Map.* New York: Viking Press, 1973.

Ramusio, Giovanni Battista. *Navigationi e Viaggi.* Vol. 1. Venice: Lucantonio Giunti, 1550.

Ravenstein, E. G. *Martin Behaim's 1492 "Erdapfel"* (also titled *Translation and Commentary on Martin Behaim's "Erdapfel"*). Reprint of portion of 1908 ed. of *Martin Behaim: His Life and His Globe.* London: Greaves and Thomas, 1992.

Reguera Sierra, Ernesto. "El Mapa de Piri Reis." *Revista Geografica Americana* 38 (July–October 1954): 43–46.

Reparaz, Gonçal de. *Catalunya a les mares, navegants, mercaders i cartògrafs catalans de l'edat mitjana i del renaixement.* Barcelona: Editorial Mentora S.A., 1930.

Richardson, W. A. R. "Mercator's Southern Continent: Its Origins, Influence, and Gradual Demise." *Terrae Incognitae* 25 (1993): 67–98.

———. "The Origin of Place-Names on Maps." *Map Collector,* no. 55 (summer 1991): 18–23.

———. "Piloting a Toponymic Course through Sixteenth-Century Southeast Asian Waters." *Terrae Incognitae* 20 (1988): 1–20.

———. *The Portuguese Discovery of Australia: Fact or Fiction?* Occasional Lecture Series, no. 3. Canberra: National Library of Australia, 1989.

Rivet, Albert L. F. "Ptolemy's Geography and the Flavian Invasion of Scotland." In *Studien zu den Militärgrenzen Roms.* Cologne: Rheinland-Verlag in Kommission bei Rudolf Habelt, 1977.

Roukema, E. "Brazil on the Cantino Map." *Imago Mundi* 17 (1963): 7–26.

———. "Some Remarks on the La Cosa Map." *Imago Mundi* 14 (1959): 38–54.

Sanderson, Ivan T. *Uninvited Visitors: A Biologist Looks at UFO's.* London: Neville Spearman, 1969.

Sarton, George. *From Rabbi Ben Ezra to Roger Bacon.* Vol. 2 of *Introduction to the History of Science.* Baltimore: Carnegie Institution of Washington, 1931.

Sauer, Carl Ortwin. *The Early Spanish Main.* Berkeley: University of California Press, 1966.

Selen, Sadi. "Piri Reis'in Şimali Amerika Haritasi (1528)." *Belleten* 1 (April 1937): 515–23.

Shaw, Stanford. *History of the Ottoman Empire and Modern Turkey.* Vol. 1 of *Empire of the Gazis: The Rise and Decline of the Ottoman Empire, 1280–1808.* Cambridge: Cambridge University Press, 1976.

Shirley, Rodney W. *The Mapping of the World: Early Printed World Maps, 1472–1700.* 2d ed. London: Holland Press, 1987.

Sider, Sandra, with Anita Andreasian and Mitchell Codding. *Maps, Charts, Globes: Five Centuries of Exploration.* New York: Hispanic Society of America, 1992.

Sinclair, Andrew. *The Sword and the Grail: Of the Grail and the Templars and the True Discovery of America.* New York: Crown, 1992.

Skelton, R. A. "The Cartography of Columbus' First Voyage." Appendix in *The Journal of Christopher Columbus,* translated by Cecil Jane, 217–27. 1930. Reprint, with additions, New York: Bramhall House, 1960.

———. "The Cartography of the Voyages." Appendix in *The Cabot Voyages and Bristol Discovery under Henry VII,* by James A. Williamson, 295–325. Cambridge: Hakluyt Society, 1962.

———. *Explorers' Maps: Chapters in the Cartographic Record of Geographical Discovery.* 1958. Reprint, London: Spring Books, 1970.

———. Introduction to *Libro do Benedetto Bordone: Nel qual si ragiona de tutte l'isole del mondo,* by Benedetto Bordone. 1528. Series of Atlases in Facsimile, 3d ser., vol. 1. Amsterdam: Theatrum Orbis Terrarum, 1966.

———. *Maps: A Historical Survey of Their Study and Collecting.* Chicago: University of Chicago Press, 1975.

Skelton, R. A., Thomas E. Marston, and George D. Painter. *The Vinland Map and the Tartar Relation.* New Haven: Yale University Press, 1965.

Smithsonian Institution. *Art Treasures of Turkey.* Washington, D.C.: Smithsonian Institution, 1966.

Soucek, Svat. "The 'Ali Macar Reis Atlas' and the *Deniz Kitabi:* Their Place in the Genre of Portolan Charts and Atlases." *Imago Mundi* 25 (1971): 17–27.

———. "Islamic Charting in the Mediterranean." Chap. 14 in *Cartography in the Traditional Islamic and South Asian Societies.* Vol. 2, bk. 1 of *The History of Cartography,* edited by J. B. Harley and David Woodward. Chicago: University of Chicago Press, 1992.

———. "Piri Re'is." In *Encyclopedia of Islam.* Vol. 8. Leiden: E. J. Brill, 1993 (1960–).

———. *Piri Reis and Turkish Mapmaking after Columbus: The Khalili Portolan Atlas.* Vol. 2 of *Studies in the Khalili Collection.* London: Nour Foundation and Azimuth Editions, 1992; New York: Nour Foundation, Azimuth Editions, and Oxford University Press, 1996.

———. "A propos du livre d'instructions nautiques de Piri Re'is." *Revue des Études Islamiques* 41, no. 2 (1973): 241–55.

Stein, Wendy. *Atlantis.* San Diego: Greenhaven Press, 1989.

Stephenson, John. *The Zoological Section of the Nuzhatu-l-Qulūb of Hamdullāh al-Mustaufi al-Qazwīnī.* London: Royal Asiatic Society, 1928.

Stephenson, Richard W. "Arlington H. Mallery and Piri Reis' Chart of the Atlantic Ocean." *Bulletin of the Special Libraries Association, Geography and Map Division,* no. 148 (June 1987): 30–32.

Stevens, Errol Wayne. "The Asian-American Connection: The Rise and Fall of a Cartographic Idea." *Terrae Incognitae* 21 (1989): 27–39.

Stevens, Henry. *Historical and Geographical Notes on the Earliest Discoveries of America, 1453–1530.* 1869. Reprint, New York: Burt Franklin, 1970.

Stevenson, Edward Luther. *Genoese World Map, 1457: Facsimile with Critical Text.* Publications of the Hispanic Society of America, no. 83. New York: American Geographical Society and the Hispanic Society of America, 1912.

———. *Marine World Chart of Nicolo de Canerio Januensis 1502 (Circa).* New York: Hispanic Society of America, 1908.

———. "Martin Waldseemüller and the Early Lusitano-Germanic Cartography of the New World." *Bulletin of the American Geographical Society* 36, no. 4 (1904): 193–215.

———. *Portolan Charts: Their Origin and Characteristics.* Publications of the Hispanic Society of America, no. 82. New York: Hispanic Society of America, 1911.

Stiebing, William H. Jr. *Ancient Astronauts, Cosmic Collisions, and Other Popular Theories about Man's Past.* Buffalo, N.Y.: Prometheus Books, 1984.

Stommel, Henry. *Lost Islands: The Story of Islands That Have Vanished from Nautical Charts.* Vancouver: University of British Columbia Press, 1984.

Story, Ronald. *The Space-Gods Revealed.* New York: Harper and Row, 1976.

Stripling, George William Frederick. *The Ottoman Turks and the Arabs, 1511–1574.* Illinois Studies in the Social Sciences, vol. 26, no. 4. Urbana: University of Illinois Press, 1942.

Taviani, Paulo Emilio. *Christopher Columbus: The Grand Design.* Translated by William Weaver. London: Orbis, 1985.

Taylor, E. G. R. *The Haven-Finding Art: A History of Navigation from Odysseus to Captain Cook.* London: Hollis and Carter, 1956.

———. "Hudson's Strait and the Oblique Meridian." *Imago Mundi* 3 (1939): 48–52.

———. Review of "*The Cabot Voyages and Bristol Discovery under Henry VII,*" by J. A. Williamson. *Geographical Review* 129 (September 1963): 339–41.

Tekeli, Sevim. "The Map of America by Piri Reis." *Erdem* 1, no. 3 (1985): 673–83.

———. "Pirī Rais (or Re'is), Muhyī al-Dīn." In *Dictionary of Scientific Biography,* vol. 10, edited by Charles Coulston Gillispie. New York: Charles Scribner's Sons, 1974.

Teleki, Paul Graf. *Atlas zur Geschichte der Kartographie der Japanischen Inseln. Nebst dem hollaendischen Journal der Reise Mathys Quasts und A. J. Tasmans zur Entdeckung der Goldinseln im Osten von Japan i. d. J. 1639 und dessen deutscher Uebersetzung.* 1909. Reprint, Nendeln, Liechtenstein: Kraus, 1966.

Thacher, John Boyd. *Christopher Columbus: His Life, His Work, His Remains.* 3 vols. New York: G. P. Putnam's Sons, 1903–4.

Tilton, David W. "Latitudes, Errors, and the Northern Limit of the 1508 Pinzón and Solís Voyage." *Terrae Incognitae* 25 (1993): 25–40.

———. "Yucatán on the Peter Martyr Map?" *Terrae Incognitae* 21 (1989): 17–25.

Tooley, R. V. *California as an Island.* Map Collector Series, no. 8. London: Map Collectors' Circle, 1964.

———. "California as an Island." In *The Mapping of America.* Edited by R. V. Tooley. 1980. Reprint, London: Holland Press, 1985.

———. *Maps of Antarctica.* Map Collectors Series, no. 2. London: Map Collectors' Circle, 1963.

"A Turkish Portrait of the World in 1513." *National Geographic Magazine* 185 (March 1994): preceding p. 1.

Valerio, Vladimiro. "Astronomia e cartografia nella Napoli Aragonese." *Rivista Geografica Italiana* 100 (1993): 291–303.

———. *Società, uomini e istituzioni cartografiche nel Mezzogiorno d'Italia.* Firenze: Istituto geografico militare, 1993.

Van de Waal, E. H. "Manuscript Maps in the Topkapi Saray Library, Istanbul." *Imago Mundi* 23 (1969): 81–89.

Van Sertima, Ivan. *They Came before Columbus.* New York: Random House, 1976.

Vascáno, Antonio. "Biographical Essay on the Renowned Navigator and Cartographer, Juan de la Cosa." Translated by Prof. Traynor. Appendix A of *Catalogue of Maps, Plans, and Charts in the Map Room of the Dominion Archives.* Edited by H. R. Holmden. Ottawa: Government Printing Bureau, 1912.

Veer, M. H. J. Th. van der, and P. Moerman. *Hidden Worlds: Fresh Clues to the Past: Did Columbus, Magellan, and Piri Reis Know the Glareanus Maps?* Translated by A. D. Hills. London: Souvenir Press, 1974.

Ventura, Antonio. *La Puglia di Piri Re'is: la cartografia turca alla corte di Solimano il Magnifica.* Cavallino di Lecce: Capone Editore, 1987.

———. *Il Regno di Napoli di Piri Re'is: la cartografia turca alla corte di Solimano il Magnifica.* Cavallino di Lecce: Capone Editore, 1987.

———. *Gli stati italiani di Piri Re'is: la cartografia turca alla corte di Solimano il Magnifica.* Cavallino di Lecce: Capone Editore, 1991.

Verteuil, Louis Antoine Aimé Gaston de. *Trinidad: Its Geography, Natural Resources, Administration, Present Condition, and Prospects.* London: Ward and Lock, 1858.

Vespucci, Amerigo. *The Soderini Letter 1504 in Facsimile.* Vol. 2 of *Vespucci Reprints, Texts, and Studies.* Princeton, N.J.: Princeton University Press, 1916.

Vietor, Alexander O. "A Pre-Columbian Map of the World." *Imago Mundi* 17 (1963): 94–96.

Vigneras, Louis-André. "The Cartographer Diogo Ribeiro." *Imago Mundi* 16 (1962): 76–83.

———. "Greenland, Vinland, and the Yale Map." *Terrae Incognitae* 4 (1972): 53–93.

von Däniken, Erich. *Chariots of the Gods?* Translated by Michael Heron. New York: Bantam Books, 1971.

———. *In Search of Ancient Gods: My Pictorial Evidence of the Impossible.* Translated by Michael Heron. New York: G. P. Putnam's Sons, 1973.

Wagner, Henry R. *Cartography of the Northwest Coast of America to the Year 1800.* Berkeley: University of California Press, 1937.

———. "Some Imaginary California Geography." *Proceedings of the American Antiquarian Society,* n.s., 36 (April 1926): 83–129.

Waldseemüller, Martin. *Cosmographiae Introductio.* Translated by Joseph Fischer and Franz von Wieser from the 1507 edition. Ann Arbor, Mich.: Readex Microprint, 1966.

Wallis, Helen. "Is the Paris Map the Long-Sought Chart of Christopher Columbus?" *Map Collector,* no. 58 (spring 1992): 20–21.

———. "Java la Grande: The Enigma of the Dieppe Maps." In *Terra Australis to Australia.* Edited by G. Williams and A. Frost. Melbourne: Oxford University Press and the Australian Academy of the Humanities, 1988.

———. Review of *Maps of the Ancient Sea-Kings,* by Charles H. Hapgood. *Geographical Journal* 133 (September 1967): 394–95.

Wallis, Helen M., and Arthur H. Robinson. *Cartographic Innovations: An International Handbook of Mapping Terms to 1900.* Tring, Hertfordshire: Map Collector Publications, 1987.

Waltari, Mika. *The Wanderer.* Translated by Naomi Walford. New York: G. P. Putnam's Sons, 1951.

Walters, Ivor. "A Short History of Nevis." In *St. Christopher and Nevis Independence Magazine, 19th September, 1983.* [Basseterre, St. Christopher: 1983].

Washburn, Wilcomb E. "Representation of Unknown Lands in Fourteenth-, Fifteenth-, and Sixteenth-Century Cartography." *Agrupamento de Estudos de Cartografia Antiga* 35 (1969): 3–20.

———, ed. *Proceedings of the Vinland Map Conference.* Chicago: University of Chicago Press, 1971.

Weihaupt, John G. "Historic Cartographic Evidence for Holocene Changes in the Antarctic Ice Cover." *Eos* 65 (28 August 1984): 493–96, 498–501.

———. Reply to letters of Daniel J. Milton and Louis Lliboutry. *Eos* 65 (18 December 1984): 1226–27.

Westropp, Thomas Johnson. "Brasil and the Legendary Islands of the North Atlantic: Their History and Fable. A Contribution to the 'Atlantis' Problem." *Proceedings of the Royal Irish Academy* 30, sec. C, no. 8 (1912): 223–60.

Whitfield, Peter. *The Image of the World: Twenty Centuries of World Maps.* San Francisco: Pomegranate Artbooks, 1994.

Wieser, Franz Ritter von. *Magalhâes-Strasse und Austral-Continent auf den Globen des Johannes Schöner.* Innsbruck: Wagner, 1881.

Williams, Glyndwr, and Alan Frost. "*Terra Australis:* Theory and Speculation." In *Terra Australis to Australia.* Edited by G. Williams and A. Frost. Melbourne: Oxford University Press and the Australian Academy of the Humanities, 1988.

Williamson, James A. *The Cabot Voyages and Bristol Discovery under Henry VII.* Cambridge: Hakluyt Society, 1962.

Wilson, Clifford A. *The Chariots Still Crash.* New York: New American Library, 1975.

Winsor, Justin. *Christopher Columbus and How He Received and Imparted the Spirit of Discovery.* 1891. Reprint, Stamford, Conn.: Longmeadow Press, 1991.

———, ed. *Narrative and Critical History of America.* 8 vols. Boston: Houghton Mifflin, 1889.

Winter, Heinrich. "Francisco Rodrigues' Atlas of ca. 1513." *Imago Mundi* 6 (1946): 20–26.

———. "The Origin of the Sea Chart." *Imago Mundi* 13 (1956): 39–44.

———. "The Pseudo-Labrador and the Oblique Meridian." *Imago Mundi* 2 (1937): 61–37.

Wittkower, Rudolf. "Marvels of the East: A Study in the History of Monsters." *Journal of the Warburg and Courtauld Institutes* 5 (1942): 159–97.

Wolff, Hans. "America—Early Images of the New World." In *America: Early Maps of the New World,* edited by Hans Wolff, translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

———. "The Conception of the World on the Eve of the Discovery of America—Introduction." In *America: Early Maps of the New World,* edited by Hans Wolff, translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

———. "Martin Waldseemüller: The Most Important Cosmographer in a Period of Dramatic Scientific Change." In *America: Early Maps of the New World,* edited by Hans Wolff, translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

———. "The Munich Portolan Charts: Past and Present." In *America: Early Maps of the New World,* edited by Hans Wolff, translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

———, ed. *America: Early Maps of the New World.* Translated by Hugh Beyer, Joan Clough-Laub, Paul Kremmer, Michael Robertson, Ian Robson, and Paula von Bechtolsheim. Munich: Prestel-Verlag, 1992.

Woodward, David. "Medieval *Mappaemundi.*" Chap. 18 in *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean.* Vol. 1 of *The History of Cartography.* Edited by J. B. Harley and David Woodward. Chicago: University of Chicago Press, 1987.

Wright, John Kirtland. *The Geographical Lore of the Time of the Crusades.* New York: American Geographical Society, 1925.

———. *The Leardo Map of the World, 1452 or 1453.* New York: American Geographical Society, 1928.

Wroth, Lawrence C. "The Early Cartography of the Pacific." *Papers of the Bibliographical Society of America* 38, no. 2 (1944): 87–268.

———. *The Voyages of Giovanni da Verrazzano, 1524–1528.* New Haven: Yale University Press, 1970.

Yerci, M. "The Accuracy of the First World Map Drawn by Piri Reis." *Cartographic Journal* 26, no. 2 (1989): 154–55.

Note: Dr. Svat Soucek's excellent study, *Piri Reis and Turkish Mapmaking after Columbus: The Khalili Portolan Atlas,* vol. 2 of *Studies in the Khalili Collection* (London: Nour Foundation and Azimuth Editions, 1992; New York: Nour Foundation, Azimuth Editions, and Oxford University Press, 1996), came too late to the attention of the author to be included in the present work to the extent that it should have been. It is recommended to the reader interested in learning more about the life of Piri Reis and about sixteenth-century Ottoman mapmaking.

INDEX

Abraklok, 13, 36
Abrolhos, 13, 36
Abyssinia, 25
Acaib al-Mahlukat (Aja'ibu-l-Makhlūqāt), 42
Acephali, 42, 44
Aegean Sea, 62
Afetinan, Ayşe, 15, 52, 59, 61, 84, 94, 155–56
Africa, 43, 48, 49, 50, 60, 61, 122, 130. *See also* land connections
Agathodaimon, 18
Akçura, Yusuf, 15, 94, 155–56
Alba sketch-map, 88
Alexander the Great, 17, 18, 33, 44, 58
Alexandria, 18, 60, 162 (n. 12); library, 66
aliens (extraterrestrials), 2, 52
Almagià, Roberto, 80, 82
Alta Vela, 89, 96, 97, 102, 123, 138
Alto Velo, 96, 97, 123, 126, 139
Amazon River, 13, 41, 42
Ambassador's Globe, 33
Andes, 41, 43
Andrea Bianco charts, 20, 27, 31, 97
Anegada, 78, 81, 127, 134
Angelo de Scaperia, Jacopo, 73
Angra dos Reis, 38, 129
animals. *See* beasts
Anonymous-Chatsworth map, 186 (n. 39)
Anonymous Spanish map in the Biblioteca Real, 121
Antarctica, 49, 52, 56, 57, 58, 59, 61, 62, 63, 64, 67, 68, 131
Antarctic Circle, 9, 12
Antarctic Peninsula. *See* Palmer Peninsula
Antiglia, 116
Antigua, 78, 82, 83
Antilia, 20, 28, 29, 30, 31, 72, 104–5, 114, 115, 116, 120, 138, 168 (n. 29)
Antonio, Isles of, 29
Anton the Genoese, 29. *See also* Noli, Antonio da
Aomaquique, 191 (n. 34)
Apianus, 192 (n. 55)
Arctic Circle, 9, 12
Aristotle, 136
Aromphi, 190 (n. 10)
asarabacca, 29
Ascension Island, 32
Asia, 43, 49, 50, 59. *See also* land connections
Atlantis, 61
Atlantis: The Making of Myth, 62
Atrato River, 41
Avalon, 3
Averroës, 136
ax, 114
azimuth equidistant projection map, 64–66, 177 (n. 63). *See also* map projections
Azores, 26–28, 29, 34, 130

Babcock, William H., 2
Babue, 138
Babura (Babueca, Baburca, Barbua, Barbulca, *Barbura*, Bubulca, Bulbulca), 97, 98, 100, 101, 102, 127, 138, 139
Badajoz, Congress of, 13
Baga, Mar de, 31, 97

Bagrow, Leo, 73
Bahamas, 87, 97–102, 130
bakkam, 114
Baleia, Ponta de, 13
Ballesteros Beretta, Antonio, 82
Barbary Coast, 25
Barbuda, 82, 83, 127
baroque pearl, 108. *See also* pearls
barques. *See* ships
Bastidas, Rodrigo de, 132, 133
Batāmiyūs, 73
Battista Agnese atlases, 13
Battista Beccario map, 27, 31
Bayzeid II, 5
Bazi döküntü, 96–97, 98, 100, 127
beasts, 30, 42–44, 45, 48–49, 68, 172 (nn. 23, 27)
Beata, 137
Beata, Cabo, 96
Beatus of Liébana map, 127
Behaim Globe, 31, 72, 91, 92, 106, 107, 108, 114, 137, 174 (n. 5)
Bella, Isla, 78, 80, 181 (n. 10)
Bella insula, 181 (n. 10)
Benedetto Bordone maps, 91, 92, 95–96
Beragua. *See* Veragua
Bergier, Jacques, 58, 62, 131
Berlitz, Charles, 61
Bernáldez, Andrés, 105
bestiaries, 42
Bibicou, H., 84
Biblioteca Reale, Turin, 121
Birbiniş (Birbinish), 89, 96, 97, 98, 99, 102, 123–27, 138
Blemmyae, 42, 44
Bomiste, 28
Bortolomye (Bartolomeo), 73
Branca, 27
Brasil, 115, 116
Bräunlich, E., 27
Brava, 27, 28
Brazil, 29, 37–38, 41, 45, 46, 49, 50
brazil (logwood), 30, 114
Brest, 20
British Isles, 10
British Museum Additional MS 31316, fol. 5, 95
Brittany Peninsula, 26
Busios, Cabo, 38

Caballones, Cayo, 105
Cabo do fim do Abrill, 119
Cabot, John, 116, 117, 186 (n. 32), 188 (n. 67)
Cabot, Sebastian, 171 (n. 10). *See also* Sebastian Cabot map
Cabral, Pedro Álvares, 43, 44–45, 46, 50
Cabras, 27
Cabrera, 27
Caicos Islands, 188 (n. 68)
caimans, 72
Cairo, 64–66
Calapoda, Giorgio, 30
California, 67
Cananea, 36–37, 38, 125
Cananéia, 37, 38
Cananor, 37
Canary Islands, 26, 27, 28, 29, 31, 32, 130, 169 (n. 34)
Canerio map, 35, 37, 42, 76, 77, 78, 86, 95–96, 110, 113, 115, 117, 118–20
cannibals, 70–71
Cantino map, 9, 12, 13, 33, 35, 37, 38, 45, 50, 66, 76, 77, 78, 81, 86, 91, 95–96, 99, 113, 115, 117, 119–20, 162 (n. 15), 171 (n. 10)
Cap du Môle St.-Nicolas, 97
Cape Verde Islands, 26, 28, 29, 31, 33, 46, 130
Capraria, 26, 27, 31
Caracueira (Caraquiera), 183–84 (n. 49)
caravels. *See* ships
Caribs, 73
Carqueixra, 183–84 (n. 49)

carracks. *See* ships
Carte Pisane map, 14
Cartier, Jacques, 66, 84
Caspar Vopel map, 91
Caspian Sea, 18, 166 (n. 40)
Castella Barrueco, 123
Castella Veragua, 134, 135, 138
Castello veragua, 108–9
Castiglioni map. *See* Ribero maps
Castilla, mar de, 34
Castilla del Oro, 110
Castillo Beragua, 134
Castle Pearl, 104, 123
castles, 25, 80, 88, 108, 122, 138. *See also* Castella Veragua
Catalan Atlas, 10, 20, 162 (n. 13)
Catalina, Isla, 123
Cataniu, 36
Cattigara, 90
cattle, 31. *See also* oxen
Caveri map. *See* Canerio map
Cay Verde, 101
Central America, 103–7, 109, 116, 121, 134. *See also* land connections; Panama; Veragua
Chanca, Diego Alvares, 71
Chapusa, 27
Chiamba, 85
Chicago, 84
Chidley, Cape, 189 (n. 67)
Chilaga, 84
China, 18
Chinese Sea, 18, 43
Christopher Columbus chart. *See* Paris map
Christopher Columbus map, 3, 17, 60, 71, 72, 77–78, 82, 83–84, 85, 87, 90, 91, 94, 111, 120–21, 131–36 passim, 179 (n. 16), 181 (n. 16)
Chrysolatras, Emanuel, 73
Ciamba, 111–13
Çin, 17
Cipango (Japan), 74, 91–95, 96, 113, 115, 134, 135, 136
Cleopatra, 64
Cohen, Daniel, 62
Collectanea rerum memorabilium, 42
Colón, Ferdinand, 72
Colonbo, 17
Columbus, Bartolomew (Bartolomé), 73, 110, 140
Columbus, Christopher: first voyage, 34, 58, 71, 74–75, 88, 91, 96, 100, 101, 103, 106, 113, 115, 119, 120, 121, 132, 137, 176 (n. 50); fourth voyage, 82, 101, 103, 106, 108, 111, 113, 117, 131, 134, 136, 138, 179 (n. 16), 183 (n. 35), 195 (n. 12); letter to Luis de Santángel, 34; personality, 136–37, 140; second voyage, 71, 73, 74–75, 77–82 passim, 86, 96, 102, 103, 105, 106, 114, 119, 120, 127, 131, 135, 137, 138, 182 (n. 23), 195 (n. 12); third voyage, 71, 72, 74–75, 82, 85, 90, 113,121, 131, 132, 133, 134, 137, 195 (n. 12). *See also* Christopher Columbus map
Columbus inscription, 69–75
columns, 25
compass rose, 10, 12, 66, 73; arrowhead, indicating north, 10
Congress of Badajoz, 13
Contarini-Rosselli map, 45–46, 50, 66, 77, 86, 91, 110, 111
Copia der Newen Zeytung ausz Presillg Landt, 45
copper-plate engraving maps, 37
Copras, 27
Cornelius Wytfliet map, 101, 108
Corte Reals, 117, 119, 166 (n. 37)
Cosmographiae universalis, 74
Cow Island, 30, 31
crocodiles, 72
Crone, G. R., 102, 106
crosses, 15

Ctesias of Cnidus, 42
Cuba, 9, 94, 103–7, 111–15 passim, 117–20, 123, 127, 134, 136, 138, 140
Cuneo, Michele de, 77, 106
Cynocephali (Cynophali), 42–43

d'Ailly, Pierre, 73
dead reckoning, 56, 60, 61, 137, 163 (n. 20), 163–64 (n. 21)
De Bure Globe, 44
degree: leagues per, 13–14; length of, 13–14, 165 (n. 25)
Deissmann, Adolf, 8
delil, 100
deliler, 100
De Orbe Novo, 82
Deseada, 78, 81–82, 126, 135
Deserta Group, 26
Désirade, 78, 81–82, 83, 123
Desliens map, 95
Dilligen map fragment, 164 (n. 23)
Dominica, 77, 78, 80, 83, 86, 135
Dosalo, 28
Dösiyta, 78, 81–82, 123, 126, 133, 134
dots, 15
double equator, 163–64 (n. 21)
Dulcert, Angelino, 20, 24
Dunford, Punta, 12, 13
Durrah al-Fākhirah, al-, 191 (n. 36)
dyewood, 30, 114

Eden, Garden of, 116, 137
Eden, Richard, 183 (n. 39)
Edrisi, 30, 44
Egerton MS 2803: fol. 7v map, 108, 109, 138; fol. 8r map, 36, 108, 109–10, 111, 116, 138; fol. 9r map, 36, 37, 42, 138; world map, 116
egg, 33–34
Egypt, 25
Elcezire Izle despanya, 88, 94, 98, 99, 120–21, 123, 138
Elferno, 27, 28
Elmina (El Mina), 25, 32, 122, 163–64 (n. 21)
El Teroneso, 106
Emaye, 27
Enterprise of the Indies, 136
Epico, 27
Epiko, 27
equator, 9, 12–13, 14, 60, 163–64 (n. 21)
equatorial cylindrical orthomorphic projection, 177 (n. 63). *See also* map projections
Eratosthenes, 15, 66
Espana, Mar, 34
Espania, Isla de, 138
Española, 88, 139
Española, Isla de, 88, 139
Essequibo River, 41, 42
Ethem, Bey Halil, 8
Ethiopia, 25
euhemerism, 2, 66, 94, 171 (n. 20)
Eviko, 27

Falso, Cabo, 89, 95
Fernandina, 101, 188 (n. 69)
Fernando de Noronha, Ilha, 129
Fernão de Loronha, 35
Ferrara MS map, 91, 93
Ferro, 27, 32, 123–24, 169 (n. 34)
Finisterre, Cape, 13
Finoci, 28
Firgal, 28
Fitzgerald, Dr. Joseph H., 160 (n. 1)
Flanders, 28
Flemish Islands, 28
Florida, 67, 117, 121
Fogo, 31
Forest Island, 168 (n. 26)
Forsyth, Phyllis Young, 62
fortress, 25, 108
Fortunate Isles, 169 (n. 34)
Fra Mauro map, 67

France, 130
Francesco Rosselli maps, 102, 106, 110, 111, 113, 114, 127, 137
Frio, Cabo, 13, 38, 125, 129

Galanda, 78, 81, 123, 126
galeota, 85
Galeota, Punta, 83, 84, 133, 184 (n. 51)
galera, 85
Galera, Cabo de, 83, 85
Galera, Punta, 184 (n. 51)
Gallipoli, 5
Gama, Vasco da, 25, 46
Gambia River, 24
Ġaur, al-, 30
Gawal, 81
Gazi Kemal. *See* Kemal Reis
Gelibolu, 15
Geneva Geographical Society, 52
Genoa and the Genoese, 27–29, 30, 74, 78, 191 (n. 38); mentioned in inscriptions, 29. *See also* inscriptions
Geographia, 17, 73, 169 (n. 34)
Georgetown University, 53, 55
Gerhardus Mercator map: of 1538, 66; of 1569, 49, 68
ghande, Punta, 104, 105, 127
Giacomo Gastaldi map: of 1546, 52; of 1548, 52; of 1561, 49
Gillespie, Alan R., 61
ginger, 29
Girolamo da Verrazzano map, 66, 90
Giustiniani, Agostino, 71, 74
gold, 24–25, 30, 44, 45, 70, 71
Golfe de la Gonâve (Golfe des Gonaïves, Gulf of Gonave), 95, 96
Gomara, 28
Goodrich, Thomas D., 15, 84
Gordon, Cyrus, 60
Grande, Ilha, 38
graphic signs, 15
Gratiosa, 78, 80
Graziosa Benincasa map, 27, 31
Great Inagua Island, 97, 100, 102, 130
Greeks, 49, 62, 66, 162 (n. 12), 169 (n. 34)
Greenland, 10, 95
Gregoras, Nicephoras, 18
Guadeloupe, 71, 73, 78, 82, 83, 85, 114, 127, 133
Guanahani, 102. *See also* San Salvador; Watling Island
Guantanamo Bay, 105
Guiana, 43

Habeş (Habesh), 25
Haci Mehmet, 5
Haina, Rio, 95
Haji Abu al-Hasan (Ebul Hasan) map, 123
Haji Mehmet, 15
Hang-chow, 90
Hanoi, 90
Hapgood, Charles H., 2, 15, 40–41, 56, 58–59, 61–64, 66, 94, 102, 127–31, 155–56
Harleian map, 95
Harrison, John, 61
Harrisse, Henry, 105, 133
hatchet, 73
Henricus Martellus Germanus map, 114, 137
Hint (Hinde), 15, 33, 45
Hipparchus, 50
Hispaniola, 80, 87–96, 98, 99, 102, 130, 137; misidentified as Cuba, 94; orientation, 88, 89, 91–93, 95–96, 123, 134, 136, 137
Historia Naturalis, 42
Historia Rerum Ubique Gestarum, 73
History of Cartography, 74
Hochlega, 84
Hoffman, Bernard, 84
Hojeda, Alonso de, 132, 133, 186 (n. 31)
Homem-Reinel atlas. *See* Lopo Homem–Reinel atlas

Honduras, 117
Hyperborea, 3

Ibn Ben Zara map, 62
Ibrahim Pasha, 6
Iceland, 10
iguanas, 72
Ilde Desane, 44
Il de Sare, 44
Ilde Viyole, 44
Ileci, 28
Ileciyanko, 27, 28
Ile de kanarye, 28
Ile de tirnam delonce, 35
Ile fero, 28, 123–24
Ile tarsumanye, 104–5, 106
Ile verde, 97, 98, 100–101, 102
Ile Verde, 188 (n. 68)
ilha espanholla, 99
Ilha Fernando de Noronha, 129
Ilha Grande, 38
Ilha Santa Catarina, 171 (n. 10)
Imago Mundi, 73
India, 18, 25, 33, 43, 45, 46, 50
Indian Sea, 18
Indica, 42
Infante Dom Pedro, 67
Inferno, 27
inscription, origin of Antilia from an, 168 (n. 29)
inscriptions, 9, 15, 16, 155–56, 165 (n. 29); no. 1, 114; no. 2, 114; no. 3, 20, 73, 114; no. 4, 5, 15; no. 5, 29, 59, 69–75, 113, 132, 135, 176 (n. 50); no. 6, 15–17, 29, 34, 37, 78, 87, 91, 111, 134, 135, 162 (n. 15); no. 7, 29, 46–47, 50, 188 (n. 67); no. 8, 29, 45, 46, 50, 173 (n. 42); no. 9, 29, 48–49, 50; no. 10, 48–49, 50; no. 11, 25, 29; no. 12, 24; no. 13, 27, 29; no. 14, 32–33; no. 15, 20, 77; no. 16, 20, 29–30; no. 17, 29, 30; no. 18, 29, 46; no. 19, 29, 33; no. 20, 29, 30, 34; no. 21, 29; no. 22, 33; no. 23, 44; no. 24, 44; no. 25, 15, 44; no. 26, 15, 48, 49; no. 27, 15, 100; no. 28, 15, 43–44; no. 29, 15, 44; no. 30, 15, 45
Insularium Illustratum, 91, 92
Insulle saluagie, 31
Isabela (Bahamian island), 101, 119–20, 189 (n. 83)
Isabela (Hispaniola), 119–20, 181 (n. 10)
Isabela (settlement), 80, 90, 119–20, 133, 137
Isabela Vieja, 185 (n. 14)
Iskender dhu-l Karnian, 15, 17
Isola Bella, 181 (n. 10)
isolario, 7, 73
Isolario, 91, 95
Ispanya, Mar de, 33
Istonasia, 104–5, 120, 123, 138
Izle bele, 78, 80
Izle flores, 28
Izle Matos, 44
Izle stania, 184 (n. 1)

Jaferyas, 15
Jamaica, 97, 102, 106, 137, 191 (n. 34)
jamaiqua, 99
Jāmī, al-, 191 (n. 36)
Java, 85, 113
Jave-la-Grande, 195 (n. 8)
João II, 115
Joatinga, Punta, 38
Jodocus Hondius map, 43
jografiya, 17
Jolly, David C., 62
Jorge de Aguiar map, 32
Jorge Reinel map, 25
Juana, 120
Juan de la Cosa map, 9, 12, 13, 52, 76, 81, 82, 84, 86, 88, 95, 106, 113, 116, 119, 135, 140, 186 (n. 31), 188 (n. 67), 195 (n. 17)
Juan Vespucci map, 50, 52, 127
Junta de Badajoz, 13

Justiniani. *See* Giustiniani, Agostino
Juventud, Isla de la, 106
Juwan, Nicolo di, 30

Kahle, Paul, 2, 8, 15, 38, 40–41, 77–78, 81, 82, 83–85, 87, 100, 113, 120–21, 127–33, 155–56
kale, 25
Kale'oot, 85
Kalera, 84–85
Kalevut, 85
Kalewot, 78, 81, 82, 83–86, 127, 133, 134
Kalucaera, 78, 83, 133
Karukera, 183–84 (n. 49)
katanio, 36
Katino, 36, 125
Kav Friyo, 125
Kawad, 127
Kawaw, 78, 81, 133, 134
Kaw Punta Orofay, 104–5
Kazvini, el-, 42
Kemal Reis, 5, 6, 70, 72, 73, 74, 114, 133
Kerkeria, 183–84 (n. 49)
Keyhoe, Donald, 58
King-Hamy-Huntington map, 27, 37, 38–40, 41, 52–53, 59, 85, 95, 113, 163–64 (n. 21)
Kitab-i Bahriye, 6, 7, 15, 17, 18, 43, 60, 71, 72, 73, 114, 123, 135
kolon, 25
Konyali, Ibrahim Hakki, 84
Kopis, 28
kule, 25
Kunstmann no. 2 map, 35, 37, 38, 40, 41, 59, 85, 86, 113–14, 115
Kunstmann no. 3 map, 33, 35, 37, 38, 39, 41, 59
Kunstmann no. 4 map, 52, 83

Labrador, 189 (n. 67)
la Cosa, Juan de, 133, 140, 168 (n. 24). *See also* Juan de la Cosa map
La Isla Española, 88
Lamahich, 191 (n. 34)
land connections: Africa and Asia, 50, 127; Africa and the Southern Continent, 49–50; Asia and North America, 52, 67, 115; Asia and the Southern Continent, 49–50; Central America and Cuba, 111, 113, 115, 117, 127, 134; Central America and South America, 108, 110, 111, 113, 115, 117; Europe and North America, 52; South America and the Southern Continent, 9, 45, 46, 50–52, 59, 122, 123, 127, 173 (n. 33)
landmarks, 15, 100
Largo, Cayo, 105, 138
Las Casa, Bartolomé de, 72, 88, 105
Las Islas de los Pozos, 101
Las Once Mil Vergenes, 101–2
latitudes, 12, 47, 60, 61
latitude scales, 12, 163–64 (n. 21)
league scale, 13, 53, 165 (n. 24)
leagues per degree, 13–14
Leardo map, 27, 34
le XI milia vergine, 77
Leeward Islands, 77, 80, 82, 182 (n. 23)
legendary islands and lands, 2–3. *See also* Antilia; Avalon; Brasil; Capraria; Hyperborea; Vaka, Izle de; Lobo; Mayda; Mermaid Islands; Ophir; St. Brendan's Island; St. Matthew's Island; Salvaga; San Mateus; Seven Cities; Taprobane; Valhallah; Vinland the Good
Legname, 168 (n. 26)
Lekol di Cuvan, 168 (n. 24)
Lenox Globe, 50
Lenserto, 28
Les Saintes, 83
Lesser Antilles, 71, 76–77, 80–86, 130
Le Testu, Guillaume, 45
Lettera, 115

Lettera Rarissima, 136
Levantado, Cayo, 95
Levillier, Roberto, 40, 94
Liber insularum Archipelagi, 73
Ligurian language, 78
limpo, 90
Linehan, Rev. Daniel, 53, 56
Line of Demarcation, 33, 52
llama, 43
Lobo (Lopo, Louo, Lovo, Ovo), 26, 31
logwood, 30, 71, 114
longitude, 52–53, 60, 169 (n. 34)
longitudinal accuracy, 52–53, 60–61
Lopo Homem map, 50, 51, 52, 122, 127
Lopo Homem–Reinel atlas, 50
Los Ojos de la Babura, 97
Luculi di Juan, 168 (n. 24)
Lunde, Paul, 15
Lusitano-Germanic maps, 37, 42, 76, 95, 96, 113, 117

Macrobius map, 127
Madagascar, 84
Madeira, 26, 29, 31, 130
Magdalena, Rio, 41
Maggiolo map: of 1511, 13, 66, 110; of 1527, 66, 110
Mago, 103
Mağrip (Magrib), 25
Maia (Maya), 106
Maina (Maima), 106
Maine, 95
Maisi, Cabo, 105, 119, 189 (n. 77)
Malacca, 90
Mallery, Arlington H., 40, 53–58, 62, 63, 64, 66, 131
Mam. *See* Mayda
Mandeville, John de, 42, 136
Mangi, 103, 117, 136
Mansa Mūsa, 20
Mansanillo, Bahía de, 95
Mantua map. *See* Ribero maps
map inscriptions. *See* inscriptions
mappaemundi, 32–33, 42, 165 (n. 32)
mappamundi, 17
map projections, 53, 56, 63–66, 114, 175 (n. 35), 177 (n. 63), 178 (n. 66)
maps: engraved, 37; Italian source maps, 37, 42, 78, 110, 111, 169 (n. 41); manuscript, 37, 40–41; manuscript compared with printed, 41; Portuguese source maps, 18, 32–33, 37, 38, 42, 44, 45, 46, 48, 49, 50, 52, 60, 86, 110, 122–23, 173 (n. 42); woodcut maps, 37, 41. *See also* Christopher Columbus map
Maps of the Ancient Sea-Kings, 58
Marajó, 41, 171 (n. 16)
Marambaya, Punta, 38
Maranhão, Gulf of, 42
Marie-Galante, 81, 83, 123
marine chronometer, 61
Marinus of Tyre, 136
Martellus Germanus, Henricus, 91, 92, 102, 106. *See also* Henricus Martellus Germanus map; Yale-Martellus map
Martinique, 183 (n. 34)
Martyr, Peter, 82, 88, 115, 183 (n. 39), 186 (n. 31)
Martyr-Morales map, 108
Marvel, Josiah, 15, 85, 97, 100, 101
Matinino, 183 (n. 34)
matiz (matis), 100
matón, 100
matuh, 100
Mayda, 26
Mecia de Viladestes map, 20, 27, 33
Mercator, Gerhardus, 50. *See also* Gerhardus Mercator map
Mercator projection, 177 (n. 63). *See also* map projections
Mermaid Islands, 32
Mexico, Gulf of, 67
mile scale, 54
Miller Atlas. *See* Lopo Homem–Reinel atlas
Môle St. Nicolas, 101

Monachus map, 52, 108
monkey, 43
monoceros, 30, 43, 44, 172 (n. 26)
monsters. *See* beasts
Monte Cristi, 90
Montreal, 84
Morales, Andrés de, 96, 186 (n. 31)
Morant Cays, 101
morello, 90
Morocco, 25
motos, 100
Mouchoir Bank, 97, 100
mountains, 41–42, 44
Muhiddin Piri, 5
Münster, Sebastian, 74. *See also* Sebastian Münster map
Muradi, 6

Natividad, 88
Navida, 88
Navidad, 88–90, 126, 133, 138, 139
Nevis, 82–83
Newfoundland, 10, 66–67, 95
Nicuesa, Diego, 191 (n. 40)
Niger River, 24
Niño, Peralonso, 132, 133
Noli, Antonio da, 29
Nordenskiöld, A. E., 41
North Star, 70, 72
Nueva Isabela, 90, 133
Nunn, George E., 119–20
Nuzhatu-l-Qulūb, 42

obsidian, 73
Ocampo, Garcia de, 113
Oceano, 123
Ochelaga, 84
Ocoa, Bahía de, 89, 95
oikoumene, 17, 18, 49, 169 (n. 34)
Ojeda. *See* Hojeda, Alonso de
Old Testament, 136
Oliveriana map. *See* Pesaro map
Once Mil Virgines, 77, 78
Ophir, 3, 116
Opico, 28
Orinoco River, 41, 42, 132, 137
Ornofay, 104–5, 127, 134, 138
Ornofay, Punta, 104
Ornofay, Punta de, 139
Oro, Rio de, 24
Orofay, 127, 134, 138
Oronce Fine map: of 1531, 45, 52, 56, 62, 63–64, 90, 173 (n. 40); of 1534, 44, 52, 56, 91
Ortelius map: of West Indies, 90; of world, 59, 68, 84
Oskolores, 27
Ovo, 31, 34
Ovosano, 33, 34, 123
oxen, 30, 44, 48
Oyapock River, 42
Ozama, Río, 186 (n. 30)

Pacheco Pereira, Duarte, 52, 193 (n. 59)
Padrão, 37, 38, 46, 76, 78, 95
padrões, 25, 122
Padrón General, 13
Paksin vidad, 88–90, 98, 99, 123, 126, 127, 133, 138
Palma, 27, 123–24
Palme, 28, 123–24
Palmer Peninsula, 53, 64
Panama, 105, 108–12, 117, 130, 134. *See also* Central America
paniero, Rio, 36
Paolo dal Pozzo Toscanelli map, 102, 108, 114, 121, 137
Paolo Forlani map, 52
pappamondo, 169 (n. 41)
Pará, 42
Pareto, Bartolomeo, 27, 31
Paria, 110
Paria, Gulf of, 38, 40, 41, 42, 130, 132, 137
Paria Peninsula, 38, 40, 41
Paris Gilt Globe, 44
Paris map, 29, 30, 32

Parnaíba River, 41, 42
parrots, 30, 72, 83, 114, 120–21
parsimony, principle of, 63
Pauwels, Louis, 58, 62, 131
pearls, 71, 72, 108. *See also* baroque pearls
Perez de Luna, Fernand, 120
Persian Gulf, 18
Persica, 42
Pesaro map, 35, 37, 42, 78, 81, 95, 110, 115
Petit Terre, 83
Philippines, 95
Physiologus, 42
Piccolomini, Aeneas Sylvius, 73
Pico, 28
Pietro Coppo atlas, 91
pilot books. *See* portolans
Pina, Ruy de, 115
Pinzón, Martín Alonso, 73–74, 100, 101, 102, 106
Pinzón, Vicente Yáñez, 29, 59, 72, 86, 97, 135
Piri Reis, life of, 5–7
Piri Reis map of 1513: claims about, 1–2, 52–68, 87, 131; description, 8–18; discovery, 8, 160 (n. 1); orientation, 10–12; original size, 10; supposed longitudinal accuracy, 52–53, 60–61. *See also* maps
Piri Reis map of 1528, 6
Pius II, 73
Pizzigani chart, 30
place-names, 19–20, 68, 123–28, 180 (n. 2); Africa, 20–21, 24; Atlantic islands, 21, 27–28; Bahamas, 23, 97; Carib, 82–83, 85, 86, 133; Central America, 23, 105; Cuba, 23, 105; Europe, 21, 24; Hispaniola, 23, 88; Italian, 7, 34; Lesser Antilles, 23, 77; migrated or misplaced, 27, 77, 88, 90, 123, 124–26, 180 (n. 2), 185 (n. 8); Puerto Rico, 23, 77–78; South America, 22, 35–36, 60; Southern Continent, 22, 36; Taino, 91, 100, 102, 187 (n. 58)
Planudes, Maximus, 18
Plata, Rio de, 38, 41
Plato, 61
Pleitos, 132
Pliny, 27, 42, 115
Pole Star, 70
Polo, Marco, 73, 84, 85, 91, 102, 103, 113, 114
Porta ghande, 104–5, 127, 138
portolan charts, 3, 9–10, 13, 122, 160 (n. 11), 161 (n. 7), 162 (n. 9). *See also* portolan-style maps
portolan grid, 53
portolans, 7, 73, 160 (n. 11)
portolan-style maps, 8, 12, 25, 34, 60, 122. *See also* portolan charts
Porto Santo, 26, 29
Portugal, 115, 130
Portuguese mentioned in inscriptions, 15–17, 29. *See also* inscriptions
projections. *See* map projections
Propaganda map. *See* Ribero maps
Ptolemy, Claudius, 17, 18, 47, 50, 73, 90, 114, 127, 169 (n. 34), 174 (n. 5), 178 (n. 66); maps, 15–17, 60, 127, 136
Ptolemy I, 17, 18
Puerto Grande, 104, 127, 138, 139
Puerto Plata, 95, 96
Puerto Rico, 13, 76–80, 130
puma, 43
Punta Ornofay, Cabo, 105
pyramids of Egypt, 66, 68

Qal'ah-i-Unara, 191 (n. 35)
Qal'at feridat, 104–5, 108–12, 123, 134, 135, 138
Qatinu, 36
Qawad, 81
Qazwīnī, Hamdullāh al-Mustaufī, al- (el-Kazvini), 42
Qazwīnī, Zakarīyā b. Muhammad b. Mahmūd al-Kammūnī, al- (el-Kazvini), 42

Quariqui, 183–84 (n. 49)
Quaris, 183–84 (n. 49)
Queen Maud Land, 53–56
Quiqueri, 183–84 (n. 49)
Qulūnbū, 17, 33, 59, 70

Ramirez, Pedro, 29
Ramusio, Giovanni Battista, 173–74 (n. 42)
raya, 33
Red Sea, 18
reefs, 15
Reguera Sierra, Ernesto, 82
Reinel maps. *See* Jorge Reinel map; Lopo Homem–Reinel atlas
Rhodes, 162 (n. 12)
rhumb lines, 10
Ribero maps, 9, 13, 33, 42, 59, 164 (n. 23)
Rio de Janeiro, 13, 36, 38, 127
Rio de Janeiro, Bahía de, 125, 129
rivers, 38, 41, 42, 172 (n. 22)
rocks, 15
Rocky Mountains, 171 (n. 20)
Rodrigues charts, 27, 30, 37, 38, 39, 59, 122, 162 (n. 15), 168–69 (n. 32)
Rome Ribero map. *See* Ribero maps
Rosigo, 28
Ruscelli map, 52
Ruysch map, 13, 37, 66, 77, 86, 91, 106, 113, 117, 119, 190 (nn. 10, 27)

Saba, 78, 81
St. Brendan and the whale, 32–33, 34
St. Brendan's Island, 26
St. Christopher, 81
St. Croix, 71, 78, 80, 81, 123
St. Eustatius, 123
St. Helena, 32
St. Kitts, 78, 81, 123
St. Lucia. *See* Santa Lucia
St. Matthew's Island, 31–33, 127. *See also* San Mateus
St. Vincent, Cape, 13
Saluaga, 31
Salvaga, 31, 123
Salvages, 31
Salviati map, 13, 33
Samana, 91
Samaná, Bahía de, 89, 91, 95
Samana, Gulf of, 96
Samana Cay, 91
şami, 43–44
Samocristi, 123
Samokristi, 126
Samokristo, 78, 81
Sánchez de Carvajal, Alonso, 82
San Cristóbal, 78, 81
Sandani, 97, 98, 99, 101–2
sand banks, 15
Sanderson, Ivan T., 58
San Diego, 97, 102
San Francesko, 125
San Francisco, Rio de, 125, 129
San jorjo, 27
San Juan, 77
San Juan Bautista, 77
San Juan Evangelista, 106
Sanjuwano bastido, 77–78, 80, 181 (n. 11)
sanlique, 36
San Mateo, 122
San Mateus, 31–33, 127
Sanmetiyos, 28, 31–33, 127
San mikal, 27
Sano Saneyro, 36, 125
San Salvador, 100, 188 (n. 71). *See also* Guanahani; Watling Island
San Sanero, 127
Santa Catarina, Ilha, 171 (n. 10)
Santa Caterina, 138
Santa Crux Cristi, 78, 81, 126
Santa Cruz, 71, 80, 81
Santa Cruz, Alonso de, 52
Santalo ka, 36, 138
Santa Lucia, 82
Santa Mardia, 81
Santa maria, 104–5, 123, 126, 138

Santa Maria (Azores), 31
Santa Maria (Cuban island), 104–5, 126, 138, 139
Santa Maria de Guadalupe, 81
Santa Maria de la Nieve, 81
Santa Maria de Monserrate, 81
Santa Maria Galana, 81
Santa Maria la Antigua, 81
Santa Maria la Galante, 81, 126
Santa Maria Redonda, 81
Santa marta, 105
Santa marya (Azores), 27, 28
Santanazares (Santanaxes), 189 (n. 6)
Santángel, Luis de, 34
Santa Roque, 36, 42, 129, 138
Santelmo, 78, 80
Santemeroye, 78, 81
Sant Iago (Santiago), 97, 102
santique, 138
Sant Jago, 97, 102
Sant Nicolas, 97, 101
Santo Domingo, 90, 133, 135
Santos, 38
Sanu Saniyru, 36
Sanvolrandan, 32
São Marcos, Bahía de, 42
Saometo, 189 (n. 83)
Saona, Isla, 123
São Roque. *See* Santa Roque
São Roque, Cabo de, 42, 129
São Vicente, 27
Sâra, Island of, 44
Sare, 127
Sargasso Sea, 31, 97
Sauer, Carl Ortwin, 138–39
sauvage, 168 (n. 26)
sava, 81
Savage, 31
scale, 165 (n. 24)
scale, larger New World, 13, 163 (n. 20)
scale, league. *See* league scale
scale, mile. *See* mile scale
scales, latitude. *See* latitude scales
Schöner Globe: of 1515, 45, 85; of 1520, 13, 42, 45, 85
Scotland, 136
Sea of the Blacks, 18
Sebastian Cabot map, 43, 115
Sebastian Münster map, 52, 90, 108
Selim the Conqueror, 6
Selvagens, 31
Semana, 90–91
Seneca, 136
Senegal River, 24
Sen Nikola, 28
Sen tiyono, 28
serpents, 44, 49, 70, 72. *See also* snakes
Serras de Violas, 44
Seven Cities, 29, 30, 115, 116
Seven Seas, 17, 18, 32
Severs, Jean (Jan Severszoon or Johannes Severus), 174 (n. 14)
shallows, 15
Sheba, 116
sheep, 114
ships, 25, 27–29, 30, 32, 45, 46, 74, 81, 97, 186 (n. 31)
shoals, 15
Sier, 127
Sigogo, 28
silver, 30. *See also* gold
Silver Bank, 100
Sint, 17
Siren Islands. *See* Mermaid Islands
Smithsonian Institution, 85
snakes, 43, 49, 72
Soderini Letter, 49, 115
Solinus, 42
Solis, Juan Díaz de, 59
Sonetti, Bartolomeo dalli, 7, 73
Soucek, Svat, 73
South America, 29, 35–47, 48, 59, 60, 61, 85–86, 113, 115, 116, 121, 122, 125, 129, 131, 132. *See also* land connections
spagnia, Mare de, 34
Spain, 130

Spanish prisoner, 70, 71, 72, 73, 74–75, 131–32
spherical trigonometry, 1, 52, 64
Stiebing, William H., Jr., 62
stone, hard, 73, 114
storms, 28, 29, 30, 45, 46, 173 (n. 42)
Story, Ronald, 62
Strabo, 136
Strait of Gibraltar, 74
Strait of Magellan, 44
Suleiman the Magnificent, 6
Suma de geographia, 49
Swithinbank map, 53–56
Syene, 66, 178 (n. 66)
Syllacio, Nicolò, 71, 181 (n. 10)

Talamanca, 106
Taprobane, 3
Tekeli, Sevim, 84–85
Tenerife, 27
Terra Australis, 173 (n. 40). *See also* Southern Continent
Terra de Sier, 44
Terrestrial Paradise, 137
Theodore de Bry map, 43, 90
Tiburon, Cabo, 96
Todos Santos, Bahía de, 125, 129
Torres, Alonso de, 135
Totel Sante, 125
touchstone, 114
tower, 24–25
Treaty of Tortesillas, 33
Tres Matas, 97, 100
tres mill passos, 97
trez pozos, 97, 101
Triango (Triangulo), 100
Trinidad, 40, 83–84, 85, 133, 134, 171 (n. 16), 184 (n. 51)
Trispoze, 97, 98, 101
Tristan da Cunha, 49
Triz Matos, 97, 98, 100, 120
Trizpose, 120
tropic lines, 14, 60
tropic of Cancer, 9, 12, 13, 14
tropic of Capricorn, 9, 12, 13, 14, 63
True, David O., 176 (n. 50)
Turco, Bartolomeo, 73
Turin map, 36, 52, 81, 82, 83, 182 (n. 32)
Turks and Caicos Islands, 188 (n. 68)
Turks Bank, 100
Turks Islands, 97, 102
Turuqueira, 183–84 (n. 49)

Undice Mille Vergines, 126
Undiziverjine, 77, 102, 112, 120–21, 126
unicorn, 43, 45, 172 (n. 26)
Unknown Pilot, 168 (n. 24)
Usiet, 82

Vaca, Isla de, 123
Vaca, Isle of, 29
Vaka, Izle de, 28, 29, 30–31, 63, 123
vakami, 30, 114
Valhallah, 3
Van der Berg, 28
Van Sertima, Ivan, 60
Vatican map. *See* Ribero maps
Vendomo, 90
Venetians, 29
Venezuela, 38, 110, 130, 137
Ventore, 28
Veragua, 104, 108–12, 117, 134, 138
Verde, Cabo, 101
Verde, Isla, 97, 100, 139
Verrazzano, Girolamo da, 90. *See also* Girolamo da Verrazzano map
verzino, 30
Vesconte, Petrus, 20
Vespucci, Amerigo, 36, 37, 38, 52, 59, 115, 117, 119, 173 (n. 38)
Vieques, 78, 80
Villa de Navidad, 88
Vinland the Good, 3
Violas, 127
Virgin Islands, 77–78, 101–2, 111, 112, 121, 130, 134, 135

Viyole, 127
Volta da Mina, 32
Volta River, 24
von Däniken, Erich, 58, 62, 63, 64, 66, 131
Vopell Globe, 95
Vopell-Vavassore map, 3

Wad Draa, 24
Wadluk, 78, 81, 82–83, 85
Waitukubuli, 78, 82
Waladhi, 78, 82
Waldseemüller maps, 77–78, 117; of 1507, 13, 35, 37, 42, 76, 77, 86, 113, 114, 120, 127, 166 (n. 7), 171 (n. 20); of 1513, 13, 37, 76, 77, 86, 113; of 1516, 37, 76, 119, 120
Walie, 82
Walters, M. I., 53
Wa'omoni, 82
Watling Island, 100, 188 (n. 71). *See also* Guanahani; San Salvador
Weihaupt, John G., 61, 62
Weimar-Ribero map. *See* Ribero maps
Weimar-Spanish map. *See* Ribero maps
Western Sea, 18, 33
West Indies, 67
whale, 32–33, 34. *See also* St. Brendan and the whale
Wilson, Clifford, 62
windrose. *See* compass rose
Windward Islands, 77, 80, 85, 86, 135
Wolfenbüttel B map. *See* Ribero maps
Wolff, Hans, 41
Woodward, David, 62
wool, 114–15
Wright-Molyneux map, 59

Xamaica, 191 (n. 34)
Xamania, 106
Xaymaca, 191 (n. 34)

yale, 43
Yale-Martellus map, 91, 108. *See also* Henricus Martellus Germanus map
Yamaye, 191 (n. 34)
Yerci, M., 59, 84
Yonge, Ena L., 176 (n. 50)
Ysla Verde, 188 (n. 67)
Yucatan, 113, 117, 121

Zamascha, 191 (n. 34)
Zamberti, Bartolomeo, 73
Zanzibar, 18
Ziamba, 85
Zorzi maplets, 90, 108, 111, 123, 138–39